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DECEMBER

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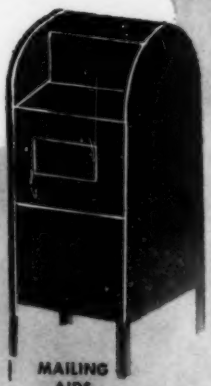

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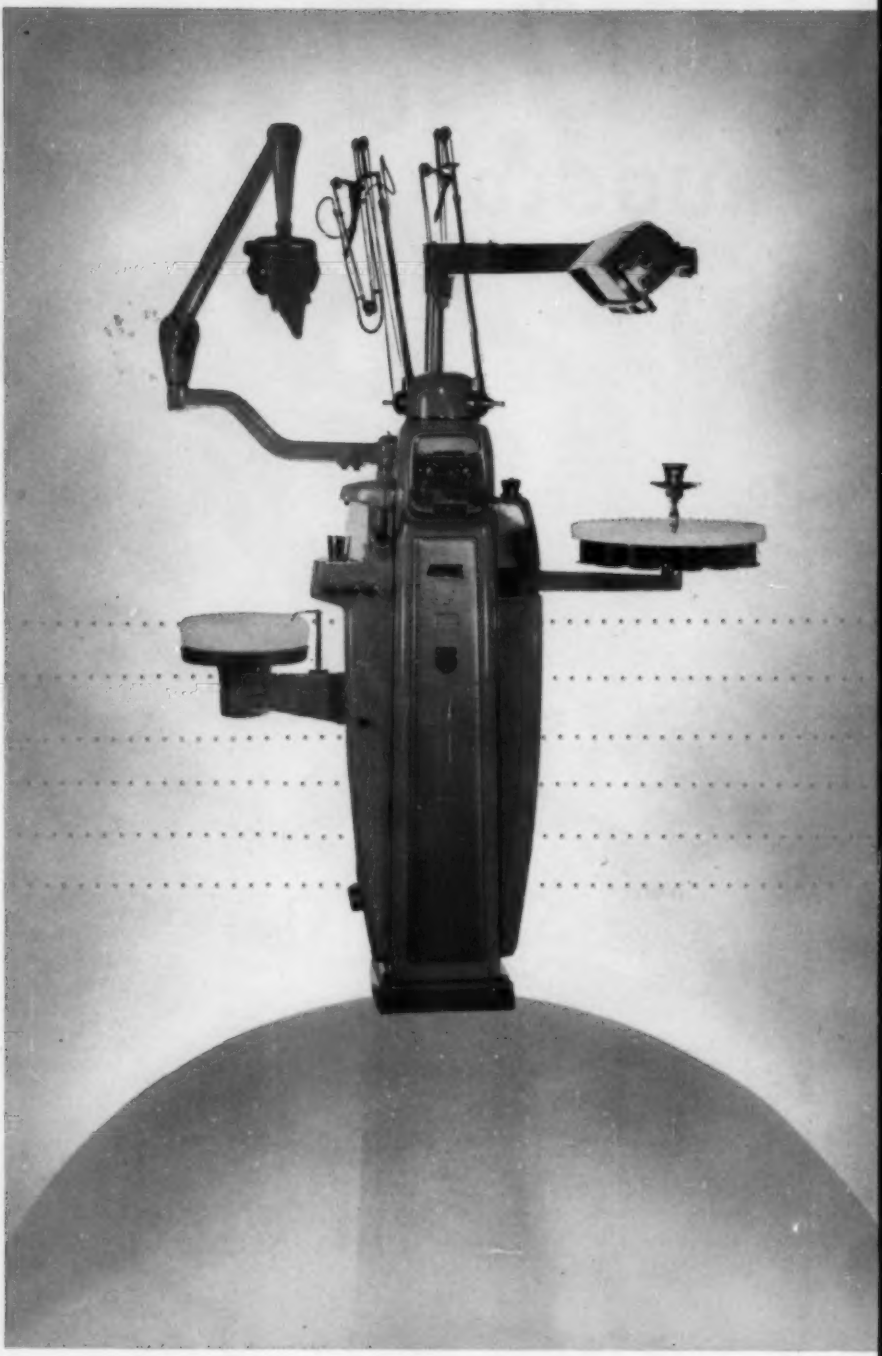

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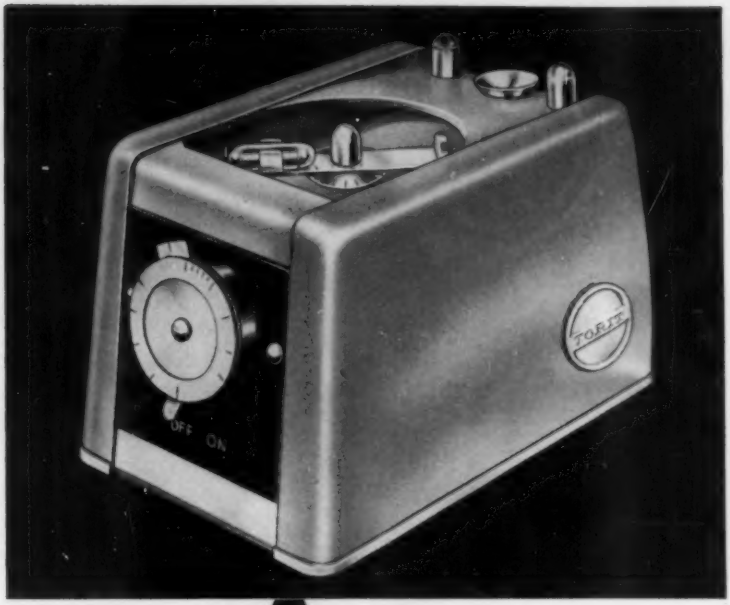

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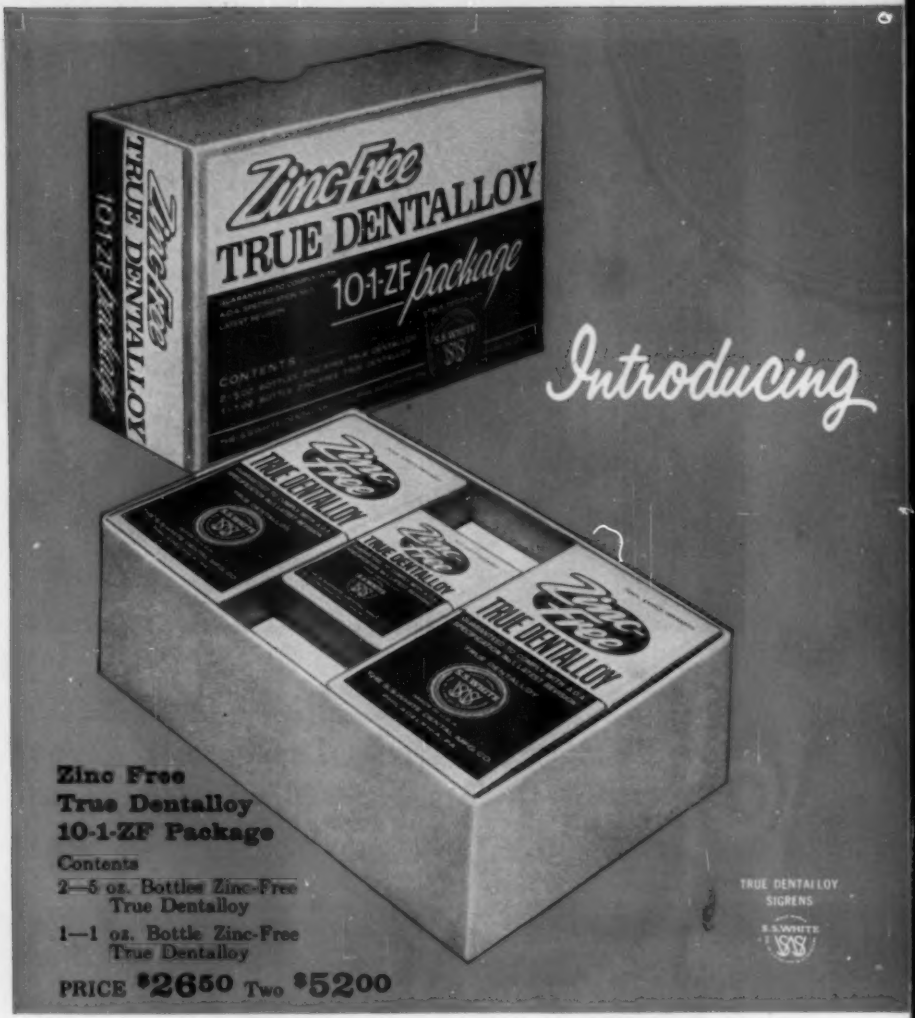

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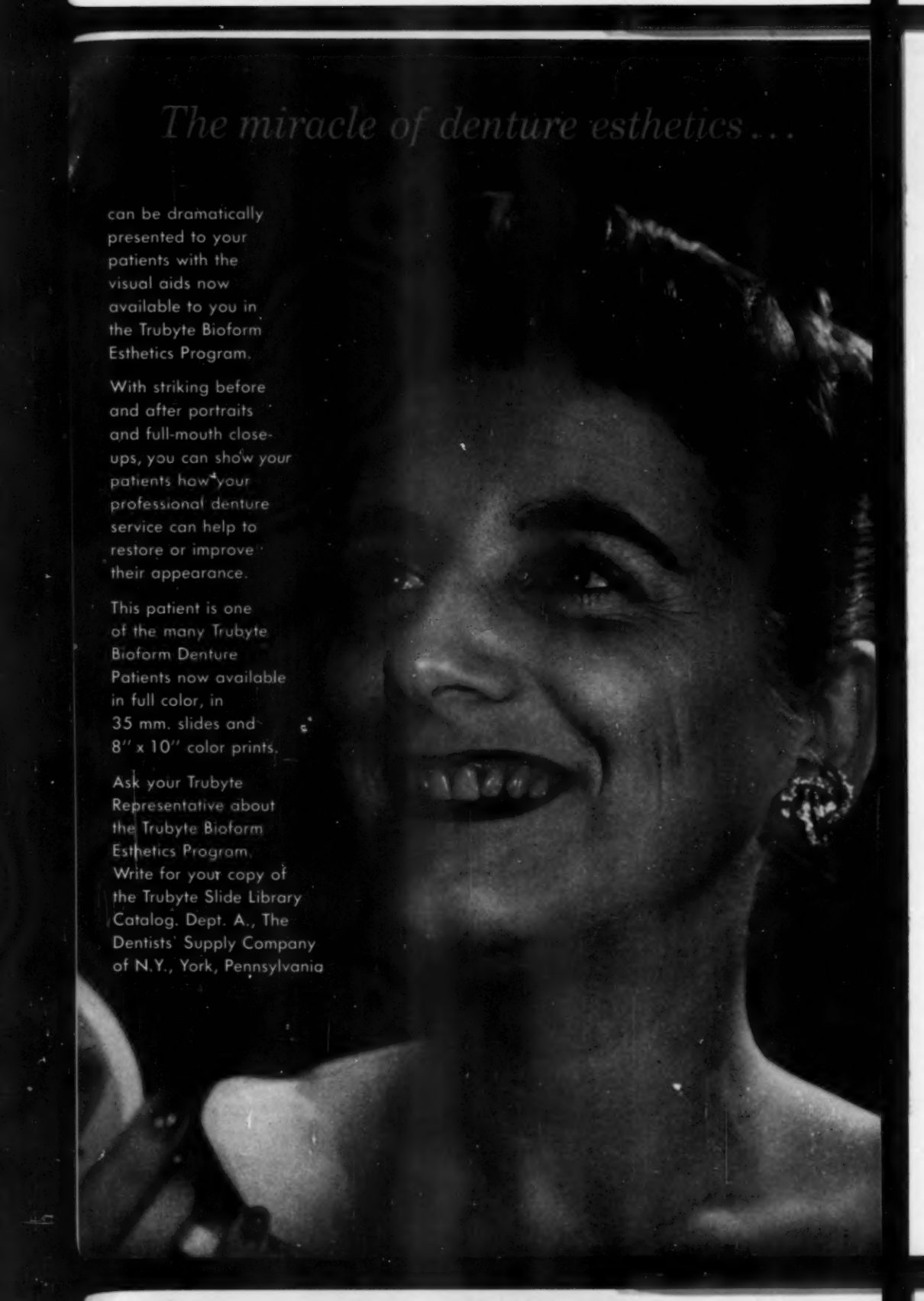
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Investigation of certain autonomic responses of children to a specific dental stress

Thompson M. Lewis, D.D.S., M.S.D., and David B. Law,† D.D.S., M.S., Seattle*

The pedodontist and the general practitioner doing children's dentistry always must be cognizant of the proper psychologic approach to the child in order to obtain the rapport necessary for effective treatment. It is a matter of common observation that whenever dentists discuss young patients, a good share of the conversation has to do with patient management. In no other field of dentistry is this quite so true. It is curious that in spite of the widespread interest in successful child management, virtually no truly scientific studies have been reported dealing with the subject.

A review of the literature reveals that probably the first objective study of child management in the dental office was undertaken by Juliet Bell.[1] In her report, Bell, a psychologist, outlined the dental procedures that were employed in a typical office situation and recorded the specific overt reactions of each child and of the dentist to these procedures, citing the actual words used by the child and the dentist. She did not, however, attempt to formulate a standard technic for securing proper rapport with any child; the task was probably impossible, since each child's psychologic background had not been determined. Such a standard technic would be impractical in any event, for a practicing dentist would not be able to obtain his own psychologic report for each child patient.

Undoubtedly the reason for the dearth of scientific material in the field of child

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1. Bell, Juliet. Psychological aspects of dental treatment of children. Madison, Wis., Journal of Experimental Education, 1943.

management in the dental office is the fact that technics for studying emotional responses in dental situations have not been perfected. All of the material thus far published in the dental literature has been based on empirical observations, colored by the personality of each author. Therefore the starting point for a scientific evaluation of the dentist-child relationship would certainly be a study of the emotions of the child himself.

Emotion is an extremely complex phenomenon. According to Lindsley,[2] emotion involves the human organism at many levels of neural and chemical integration, all of the facets being diffuse and intermingled. Basically, and in simple terms, Jersild[3] describes emotion as involving an experience of feeling. Such feelings are commonly described as love, fear, anger, and jealousy. According to Ryan,[4] a preschool child who has not been preconditioned may be "mildly anxious" or exhibit emotion in the dental environment. After a child enters school, however, he comes into contact with older children who are able and willing to express their anxieties. These verbalized apprehensions may be vivid tales of horror concerning the dentist and, even in a child who has had no previous contact with dentists, there may develop a state of fear or anxiety toward any dental situation.

Since there is such a dearth of information available on the child's true emotional response to dentistry, it was logical to seek first the answer to the question: how can the child's emotions be recorded and evaluated in such a manner that the data obtained are of a significant scientific nature?

In the field of experimental psychology certain basic research on children's emotions has been conducted successfully utilizing electronic equipment to record physiological changes of a transient nature occurring in the body under stress. Jones,[5] Lacey,[6] and others have demonstrated in recent studies, using such equipment, that it is possible to measure emotional changes in children at play. Adapting this equipment to the dental operatory was therefore the first step in the direction of a scientific approach to our problem.

Having obtained a method for measuring emotional changes, the next question was: what dental situations cause anxiety in a child? The specific problem investigated in this study involves one of the most controversial issues among dentists who practice on children; that is, should a parent be present in the operating room during dental treatment of the child?

If the child is more anxious in the absence of the parent, certain changes will take place which can be measured. In this study four psychophysiological responses were simultaneously recorded. These were the galvanic skin response, face temperature, hand temperature and the heart rate.

The galvanic skin response is probably the best known indicator of emotional tension because of its use in the lie detector. Basically the measurement is made in accordance with the amount of sweating, which has been found to increase when the individual is apprehensive. The resistance of the skin to an electrical impulse decreases as sweating increases. This in turn produces an increase in the recording. As in all of the other measurements employed in this study, the ease with which this recording can be made enhanced its desirability for use.

The temperature of the hand has been reported by Mittelmann and Wolff to

2. Lindsley, D. B. Emotion: a handbook of experimental psychology. New York, John Wiley & Sons, Inc., 1951, p. 473.

3. Jersild, A. T. Child psychology, ed. 3. New York, Prentice-Hall, Inc., 1947.

4. Ryan, E. J. Psychobiologic foundations in dentistry. Springfield, Ill., Charles C Thomas, 1946, p. 62.

5. Jones, H. E. The study of patterns of emotional expression. U. Reported at the 2nd International Symposium of Feelings and Emotions, University of Chicago, Oct. 30, 1948.

6. Lacey, J. I., and VanLehn, Ruth. Differential emphasis in somatic response to stress. Psychom. Med. 14:71 March-April 1952.

show a decrease under stress.[7] This is presumably due to a vasoconstriction caused by an increase of epinephrine. Therefore, by using a thermistor on one finger and observing the temperature, a fall in the reading may be interpreted as indicating the onset of anxiety. The face temperature, however, appears to react in the opposite manner. Ax[8] has shown, in his study of schizophrenic patients undergoing lobotomy, that a significant drop in the temperature of the face can be correlated with the findings of reduced tension. Thus, with the temperature of the hand dropping and that of the face increasing under stress, these two phenomena furnish valuable information for mutual substantiation.

The cardiac rate which is recorded on an electrocardiogram offers another fairly common method of measuring autonomic response. It is common knowledge that under stress, the heart rate becomes more rapid. However, as to the true meaning of this increase in rate, Darrow[9] warns that conclusions should be drawn only with the greatest care, since the increase reflects the influence of both the sympathetic and the parasympathetic nervous system.

The equipment used in the investigation consisted of a Grass electroencephalograph machine and a Hammcraft conversion unit (Fig. 1). The electroencephalograph or polygraph machine is an electronic instrument for the simultaneous recording of several psychophysiological responses. This record is preserved on a continuous moving tape and is similar to that obtained by a lie detector. The instrument used in this study had four amplifiers and pens measuring the four variables.

The Hammcraft converter unit consists of a main chassis, two multiconductor cables, a subject terminal box and a set of electrodes and transducers. The temperature transducers consist of two small thermistors measuring 3/16 inch by 1/16 inch. The electrodes for receiving the galvanic skin response (G.S.R.) are made of sterling silver and are of practically the same dimensions as the thermistors. The wrist ground and angle electrocardiograph electrodes are 1 inch by 1½ inch pieces of thin sterling silver. The leads are of flexible wire about 1/64 inch in diameter. Each lead has distinctly colored insulation for purposes of easy identification. The ear electrocardiograph electrode is made of two pieces of thin sterling silver about ½ inch by ½ inch, each piece soldered to a spring which clamps it to one side of the ear.

Though not controlled, room temperatures ranged from 73° to 75° F. However, Talbot[10] has shown that small variables in room temperature do not affect skin temperature significantly.

Two rooms were necessary for conducting this experiment. One was a standard dental operating room. Bolted to the bottom of the seat of the dental chair was the subject terminal box containing the four sets of leads with each wire bearing a distinctive color, leading to the patient. Located inconspicuously on the x-ray machine next to the dental chair was a microphone the speaker of which was in the adjoining room where the polygraph technicians were located. A signal light was located behind and out of view of the patient.

Since a microphone was located in their laboratory, the polygraph operators could hear what was being said in the operating room, and appropriate notations could be made on the polygraph paper at the proper moment concerning the activities and conversation of the child, the parent and the dentist.

7. Mittelmann, B., and Wolff, H. G. Emotions and skin temperature: observations on parents during psychotherapeutic (psychoanalytic) interviews. Psychom. Med. 5:211 July 1943.

8. Ax, A. F. Postlobotomy physiologic changes as seen in polygraph studies: frontal lobes and schizophrenia. New York, Springer Publishing Co., Inc., 1953, p. 288-295.

9. Darrow, C. W. Physiological and clinical tests of autonomic function and autonomic balance. Physiol. Rev. 23:1 Jan. 1943.

10. Talbot, F. B. Skin temperatures of children. Am. J. Dis. Child. 42:965 Oct. (Pt. 2) 1931.

Fig. 1 • An operator seated in front of Grass electroencephalograph (E.E.G.). The cord which controls signal light lies over back of polygraph machine and directly above pens. Beyond the operator is the Hammcraft conversion unit with the loudspeaker directly on top of unit

METHOD OF PROCEDURE

Nine boys and nine girls between five and one half and seven years of age, who had presented no particular management problem in previous dental situations, were selected. Each child was tested twice. The mother was told to inform the child only that he had a dental appointment for the purpose of cleaning his teeth.

On arrival the child was allowed to remain quietly in the waiting room for 15 minutes. The child was then led into the operatory and seated in the dental chair. He was told that before the cleaning was started, some colored "strings" were going to be placed on one leg and some of his fingers (Fig. 2).

First, after the child had been informed about the "strings," an electrocardiograph electrode was attached by tape to the right ankle. Second, the ground electrode was attached to the left wrist by a rubber band. Third, the galvanic skin response electrodes were attached by tape to the first and second fingers of the left hand. Fourth, the finger thermistor was attached by tape to the fourth finger of the left hand. Fifth, the face thermistor was attached by tape to the highest prominence of the left cheek. Sixth, the second lead of the electrocardiograph was attached by a clip to the left ear lobe. With completion of the preparation, the child was told to sit comfortably and quietly (Fig. 3). All movements made by the dentist in the presence of the child were purposely kept as smooth and calming as possible.

Conversation was kept at a minimum It was found early in the testing, however, that unless a reasonable amount of talk was carried on with the child, it was almost impossible for him to remain quiet. The topics of conversation were always kept on the pleasant side, with references to such things as the zoo, swimming, and food. If the child was of a talkative nature, he was allowed to ramble on, so long as action did not accompany his speech.

Jones[5] has shown that children have had certain polygraph equipment successfully attached to them even when

Fig. 2 • Rear view of child seated in dental chair. Attached to the lower left side of the seat is the subject terminal box with leads passing to child

they were very young. He has also demonstrated the fact that the children who appear to be calm are apt to be the most anxious. Hence, it was decided that it would be possible to select children for the present study on the premise that they would probably be overtly quiet and that the reactions of the autonomic nervous system would not be distorted by the lack of any gross movements. Therefore, children were selected who had previously received considerable dental treatment and who were old enough to follow directions well.

It is interesting to note that in no instance did any of the 18 children balk or appear distraught over the application of the electrodes. Each child seated himself in the dental chair and readily submitted to having the leads placed in position. One of the main reasons for the success of this part of the experiment was the fact that at no time were the leads referred to as wires. They were always called "strings." No child ever mentioned that the "strings" might be of some other material.

In connection with this step, it is noteworthy that on the second visit of each child, he or she would appear almost eager to have the leads put in place. An air of mystery seemed to hover about the "strings" as the dentist, at least once, referred to them as being "necessary to run a space ship."

Only two complaints were made by the children. Their chief objection was to the 28 minutes of restricted mobility in the dental chair, and rightly so. This is obviously a long period of time for a youngster to remain quiet. The second objection was to the removal of the adhesive tape. Since these two objections to the procedure were the only ones and were not too vehement, it was concluded by the investigators that no real obstacle to future study along the same lines had developed.

The child remained in the dental chair for 28 minutes, the first ten minutes being required to attain a state of so-called "rest." After ten minutes the signal light, behind and out of view of the child, was flashed by one of the polygraph operators. The dentist then stood up slowly and told the child that it was time to clean his teeth. The dentist turned on the overhead light, adjusting it to shine on the child's neck and not on the face thermistor. The cleaning was done in a standard manner each time, with only a rubber cup and pumice being used.

The major problem encountered during the prophylaxis was in trying to keep the child's overt reactions to a minimum. Movement of the arms or closing of the hand would cause a false reading of the galvanic skin response and of the hand temperature. This was controlled by making sure that all directions were followed by the child in a slow, deliberate manner. Tranquility and deliberation were necessary attributes of the dentist at all times.

After the last rinsing, the dentist turned off the overhead light and complimented the child on his fine behavior. Then the child was told to sit quietly, as he had

Fig. 3 • Side view of the child seated in dental chair. Electrocardiograph electrodes are attached to right ankle and left ear lobe. The ground electrode is attached to the wrist. Electrode wires for galvanic skin response and the thermistor for the hand temperature are attached to fingers of the left hand. The face thermistor is attached to highest prominence of left cheek. Ground wire also leads from dental chair to unit

been doing, and that the dentist would bring the mother into the room. The dentist then went out to the waiting room and told the mother that she was to enter the operating room, sit down in a chair facing the child and talk either to him or to the dentist about anything that she cared to, or not talk if she preferred. The only request made was that she refrain from referring to any of the wires which were attached to the child.

The mother then entered the operating room, followed by the dentist. She seated herself in the chair facing the child, as the dentist resumed his position on his stool. At this point, unless the child needed reminding to keep perfectly still, the dentist allowed the parent to introduce the topic of conversation. The dentist, however, tried to guide the conversation so that the child would be included as much as possible.

After ten minutes, the signal light was flashed. The child was told that the teeth were again going to be cleaned, and another prophylaxis was done precisely as it had been the first time. On completion of the prophylaxis the overhead light was turned off, the child was praised and informed that the session was finished. He was then released from the equipment in the reverse order in which it had been applied.

The second appointment was carried out exactly as the first had been, except for one variation. The child was accompanied by the parent into the operating room and the electrodes were placed in the presence of the mother. When the first prophylaxis, or stress, had been completed, the parent was asked to go out and wait in the reception room. After the second rest period, the prophylaxis was repeated just as it had been during the first part of the first session, only in the absence of the parent.

It is apparent that one of the most important considerations in this type of research is the interpretation of the polygraph recording and the compiling of the data obtained from it. After each day's testing, a series of calibrations was obtained for each of the four measurements: galvanic skin response, face temperature, hand temperature and heart rate.

In the interpretation of the graphs, one of the first decisions must be the determination of the "period of rest" prior to the application of stress. For this study a rest period of one minute prior to the stress of the prophylaxis was selected, as it was believed that the child was most apt to be physiologically and mentally rested at that time.

Occasionally the child obviously was not in the desired state of rest. In some instances the subject reacted to the conversation and thus anxiety was produced and recorded. Therefore when the stress was applied, the subject was actually in a period of recovery from the stress produced by the conversation. The reaction to the dental stress was not a true evaluation. However, by having a sufficient number of subjects, and a sufficient number of trials, the effect of such errors can be reduced to minor significance.

The period of stress was during the prophylaxis. Measurements of the galvanic skin response, face temperature and hand temperature were determined for base level, maximum increment and maximum decrement by taking the basic readings as shown on the polygraph, plus or minus the amount of the pen excursions. Thus, as the result of accurate calibrations, the exact reading was obtained. The heart rate was determined by counting the number of beats for any 3 cm. of recording stress. This was then multiplied by six to obtain the proper number of beats per minute.

Readings of any of these graphs were taken only in those areas where movement of the body was not considered to be a factor.

Figure 4 shows a portion of the type of graph recording which the polygraph produces. The top line represents the gal-

vanic skin response of the patient. Galvanic skin response (G.S.R.) is often referred to by other names, such as the psychogalvanic reflex, skin resistance, palmar conductance and electrodermal response. When the galvanic skin response rises, it has been demonstrated that the patient is in a state of anxiety.

The second line from the top is a recording of the face temperature, given in dial units which are later converted into degrees centigrade by use of a predetermined graph. When the temperature of the face rises, the subject, as shown by Ax,[8] is considered to be undergoing anxiety.

The second line from the bottom represents the temperature of the hand. This, too, is read in dial units and later is converted into degrees centigrade. When the temperature of the hand decreases, Mittelmann and Wolff[7] have demonstrated, an individual is considered to be in a state of anxiety or fear.

The bottom line of the graph represents the heart beat. A rapid heart rate is considered by Darrow[9] to indicate a state of anxiety or fear.

STATISTICAL ANALYSIS

The following data were judged statistically: the galvanic skin response at a resting or base level and maximum increment level during stress; the temperature of the face at a resting or base level and the maximum increment level during stress; the temperature of the hand at a resting or base level and the maximum decrement level during stress, and the heart rate at a resting or base level and the maximum increment and decrement levels during stress.

The foregoing data were obtained both when the parent was in the room and when she was out of the room. Also the raw scores between "parent in" and "parent out" were compared. Finally the raw scores of the first session and of the second session were compared.

The quantity of material which is obtained in polygraph procedures encourages the use of a simple method of analysis. Therefore, the Wilcoxon matched pairs test, using signed ranks, seemed to fit the problem. This test was chosen because it implies no knowledge of the distribution of the data and does not assume that the data are in an integral scale.

STATISTICAL RESULTS

Throughout this study the following hypothesis was tested, namely, that there is no difference in the autonomic reaction of a child during a dental appointment involving oral prophylaxis that can be attributed to the presence or absence of the parent.

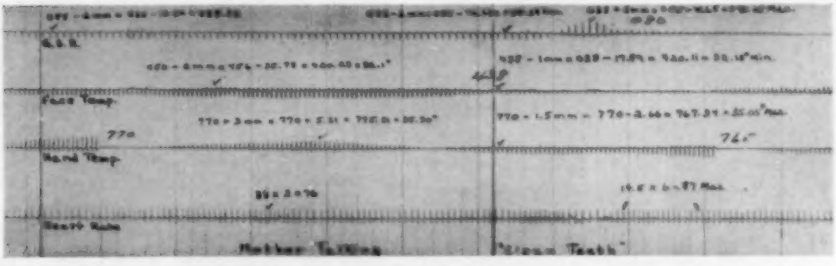

Fig. 4 • Polygraph recording showing period of rest and beginning of stress. Notations on bottom of graph are recorded by polygraph operator as the result of conversation occurring in dental operatory. Readings taken only when record appears to be result of autonomic response

Figure 5 demonstrates that when the Wilcoxon test is applied, the mean figures of the two appointments being used, only one instance is found in which the hypothesis can be rejected, and that occurs in the base level of the heart rate. It then shows that the heart rate of the child when the parent was out of the room was faster than when the parent was in the room.

Likewise, the base rate and the increment levels of the galvanic skin response and the temperature of the face were elevated, though not significantly so. In contrast to this, the base rate and the maximum decrement levels of the temperature of the hand were more depressed when the parent was out of the room.

Figure 6 compares the raw scores made during the first appointment with those of the second appointment. Only the base level of the temperature of the face was significantly changed, demonstrating more anxiety at the second appointment. Insignificant higher base or resting levels of the heart rate were recorded during the second appointment.

Other findings for this comparison indicated the following tendencies: during the first appointment the base and increment levels of the galvanic skin response were higher, the increment level of the temperature of the face was higher, the base and decrement levels of the temperature of the hand were higher and lower respectively, and the base increment and decrement levels of the heart were higher and lower respectively.

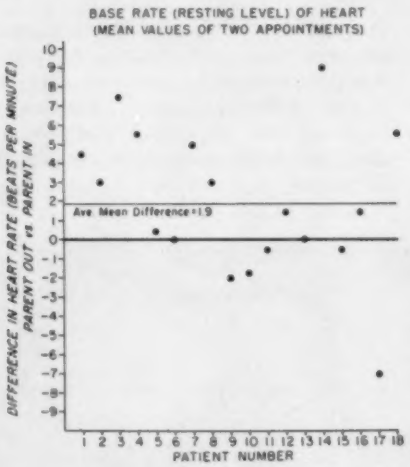

Fig. 5 • When Wilcoxon test is applied, the mean figures of the two appointments being used, one instance shows that heart rate of the child when the parent was out of the room was faster than when the parent was in the room

DISCUSSION AND CONCLUSIONS

The feasibility of the polygraph technic for measuring children's emotional responses in the dental operatory has been definitely established. It should be pointed out that in the specific study undertaken, the objective was to test the basic hypothesis that no difference, attributable to the presence or absence of the parent, exists in the autonomic reactions of a child with previous dental experience during an appointment involving oral prophylaxis. Three of the four physiological responses recorded showed no significant change under the experimental conditions. The fourth, the heart rate, did show a significant change when the parent was excluded from the room. The significant response of one variable is, however, not enough to alter the basic conclusion that the parents' presence or absence creates no appreciable anxiety in the child during prophylaxis. Slight changes in the other responses were observed when the parent was excluded. For instance, when the parent was out of the room, there was a small elevation of the face temperature and galvanic skin response. The hand temperature base and decrement levels were somewhat depressed. These findings indicate the sensitivity of the method, which has great possibilities in casting new light on problems concerning the patient's reaction to dentists and dentistry.

In any studies of the nature of this one involving considerable apparatus, the question always arises as to the effect of the equipment itself on the subject. The Wilcoxon significance test was applied to the findings from the first and second appointments to determine what differences were apparent. No significant pattern of variation was found in three of the four responses measured. The base level of the face temperature did show a significant increase during the second appointment, but this in itself is not sufficient to alter the conclusion that the apparatus itself generates no particular anxiety. This corroborates the findings of Lacey[6] who showed that retesting produced similar results.

All psychological testing methods have certain disadvantages and the polygraph technic is no exception. A team of at least three well trained persons, including the dentist, is necessary for conducting the experiment. In addition, the equipment is of such a technical nature and so removed from the average dentist's knowledge that close cooperation is essential between the electronics technician, psychologist, and dentist. With these difficulties overcome, the greatest problem, undoubtedly, is the interpretation of the voluminous data, for without proper interpretation the results are of questionable significance.

The possibilities of emotional studies in the dental situation by the polygraph method are almost unlimited. In the nonoperating procedures, such things as presence of auxiliary personnel, colors of gowns and rooms, presence or absence of instruments and effect of background music could be studied. In operating procedures, the noise produced from handpieces at various speeds, noise of the x-ray timer, methods of administering and types of anesthetics and the use of certain instruments could be tested. In this respect, polygraph technics offer great promise in the study of children's emotions and child management, an area of dentistry which, until now, has been predominantly a matter of personal opinion.

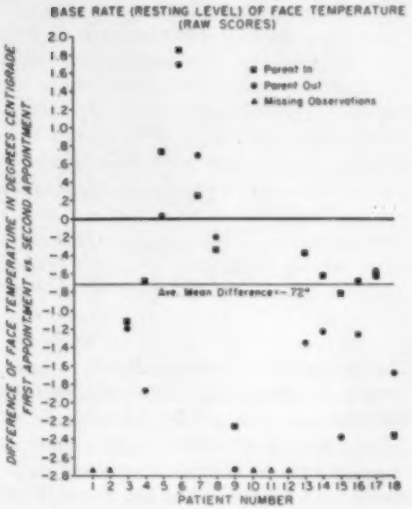

Fig. 6 • Comparison of the raw scores made during first appointment and those of second. Only base level of face temperature was significantly changed, demonstrating more anxiety at the second appointment

SUMMARY

1. The use of the polygraph technic for measuring heart rate, face and hand temperature, and galvanic skin response, has been found to be a practicable method for the study of children's emotions under dental situations.

2. Nine boys and nine girls between the ages of five and one half and seven were tested with regard to their psychophysiologic reactions to the presence or absence of the parent from the operating room during a dental appointment involving oral prophylaxis.

3. Practically no significant differences were determined in the psychophysiologic reactions of the child of this age who had had previous dental experience, regardless of whether or not the parent was present in the operating room.

Dental care of the chronically ill child

Paul K. Losch, D.D.S., Boston

The appellation "chronically ill" indicates a prolonged morbidity interfering with the function or form, or both, of a part or the whole of the human organism—prolonged because the disease cannot be cured or the organism restored to "normal condition" by known methods of treatment.

To take each known chronic condition in children and describe the precautions, consideration, and technics necessary for adequate dental care would require a writing of textbook proportions. For practical purposes then, this discussion must be confined to general consideration of dentistry's responsibilities and limitations in offering dental care to a few of those patients whose chronic illness complicates routine dental care.

"Routine dental care" has a special significance since by the very nature of the profession's training and objectives, dentists are constantly striving to preserve and restore one small part of the human body in a state nearing what has come to be recognized as perfection for the human organism. Therefore, at the chairside the dentist "routinely" examines the mouth and teeth, diagnoses digressions from normal, and prescribes and executes treatment in this small region with a concentration on the local demands for perfection in health and function. It is often easy to overlook the role this region plays in its relation to the whole organism. For example, if a lively, pretty, socially well-adjusted 11 year old girl exhibits, because of trauma, the necessity of endotherapy on a superior central incisor, one would hardly think twice about executing the treatment. If, because of parental anxiety over the marred beauty of her child, the mother fails to volunteer the information that the patient is a diabetic, and if, under the stress of urgency because of recent trauma, the dentist fails to inquire about the general health of the patient, this perfectly satisfactory local treatment becomes a grave liability to the whole organism even though the disease is well controlled. It is grave because any treatment involving the pulp cavity of a tooth may eventually be involved with infection which is a liability to the health of a diabetic patient. The lessons here are that not all chronically ill children are hopeless cripples, and that treatment to the mouth or teeth is seldom local in its total effect.

A reminder of the importance of proper history taking is indicated at this point. Often in chairside routine care, the history reveals a chronic illness such as cardiovascular or hematological disease which is known to be of serious concern to the health or life expectancy of the patient. Such patients are rare in a

Presented as part of the panel discussion, "Dental Treatment for the Chronically Ill," before the ninety-eighth annual session, American Dental Association, Miami Beach, Fla., November 6, 1957.

regular general practice of dentistry, and, consequently, all too often they are refused treatment or are the recipients of temporizing inadequate care because of some vague fear on the part of the operator that he will create a crisis. For example, it is preferable to have a patient who is a known hemophiliac appear at the hospital hemorrhaging from a small laceration of his gum or cheek inflicted by a dental bur than to see that patient exhibit a fulminating dentoalveolar abscess caused by lack of adequate dental care to what was once a simple carious lesion—all because of fear on the part of the operator that he would traumatize soft tissue. It must be kept in mind that in spite of his chief complaint, any patient able and willing to receive regular dental care deserves that service even though there are calculated risks involved.

Frequently, special precaution may be indicated in treating the chronically ill, but often, with only slight alterations of the usual procedures, adequate care can be rendered. For example, short appointments to prevent fatigue and avoidance of vasoconstrictors in the use of local anesthetics may be required to treat a patient with cardiovascular disease, but these slight divergencies from customary procedure certainly do not warrant refusal of treatment or inadequate care. The chief requirement in such cases is that a carefully planned course of treatment be made only after an adequate understanding of the problems involved. This understanding usually includes an intimate acquaintance with the child and perhaps his parents, and, above all, adequate consultation with the child's physician which makes clear the dental diagnosis and plan of treatment.

It is to be regretted that a few operators take ready refuge in referring these problem patients to a "dental specialist." Obviously such operators are reluctant to take the time and make the effort to understand the patient and his disease. Many patients should be referred to doctors or clinics where special and often expensive equipment is available, but all too often such referrals are indulged in to avoid the responsibility of care. Apropos of this responsibility, no one, specialist or general practitioner, should assume the care of patients whose condidition signifies special risks and special care without thoroughly explaining the liabilities to the patient or parents and gaining their wholehearted consent to the procedure.

This is not to say that general practitioners make a habit of dodging their responsibilities. This would be far from the truth; indeed, in this problem of caring for the chronically ill child as in all of dentistry for children, the general practitioner, by and large, is not only a responsible person but is the bulwark of the profession.

LIMITED TREATMENT

Adequate if not complete care for the mouth and teeth of chronically ill children is recommended, but there is a pitfall; that is knowing when to stop in offering treatment. So many times eagerness to restore a damaged dentition clouds judgment of its usefulness to the person involved. For instance, the incompetent and ineffective mentally retarded child whose vegetative existence denies the possibility of adequate and constant hygiene, and whose susceptibility to dental decay is high and constant, very well may be better off without teeth than with them—this, in spite of the role of dentitions in nutrition. Many such patients have been subjected repeatedly to either restraint or general anesthesia to have repairs done to teeth that were essentially useless to him. If for no other reason than economics, these repeated efforts to save teeth that are not used to chew with, are inevitably dirty liabilities to general health, are useless in speech, and have no esthetic value, would seem unwise.

There is always a middle road, and the exercising of good common sense seems important in all plans of treatment. One of the frequent reasons children with chronic illnesses are referred to the dental clinic in the Children's Medical Center in Boston is revealed by the referring doctor in some such statement as this; "I can't get anything but cement fillings in his teeth. He is a good kid but he just can't hold still long enough for me to get any good work done. I thought perhaps you could put him to sleep and do something better." Such a referral implies that the operator is unconsciously reluctant to face the limitations of service. Although there are no reasons for not administering a general anesthetic to achieve operative dentistry under the proper conditions, it would be impossible to take care of all the patients that might be referred on the basis of expediency in patient management or an unwillingness on the part of the operator to compromise on the quality of dentistry ordinarily achieved.

In dentistry for children, as in all pediatric services, the aim is to protect health, guide growth and development where possible, and instruct the patient in hygiene. Any compromise in these obligations which may have to be made because of limitations of the patient must be faced with common sense. If an irregular cavity preparation capable of receiving only a cement restoration is the best that can be achieved in protecting a restive child from pain, infection, and an interrupted development of the dental arch, there is nothing to criticize in such service. It undoubtedly means more frequent visits for the patient, and therefore most likely more expense for the parents; but if it meets the demands of adequate pediatric dentistry as described, it is a laudable service. All too frequently achievement is judged by what co-workers might say about the technical qualities of the work rather than the actual value of the service rendered. A precisely executed restoration is a beautiful thing to behold and certainly a desirable objective, but where conditions warrant compromise of technical objective to achieve health service, no criticism should be made or apology expected.

In connection with the theme of temporizing compromise, there is a relatively small but important group of chronically ill children whose disease inflicts lingering, often terminal, periods of bed care—conditions such as are seen in some neoplastic diseases, leukemia, some types of xanthomas, organic diseases such as nephrosis and progressive diseases such as muscular dystrophy, and so forth. In their general care, these patients are treated symptomatically except where experimental therapy is being tried. The chief aim is to prevent and control acute infections, maintain good nutrition, provide care and facilities for body comfort and establish good mental hygiene in the patient.

When requests for dental care of such unfortunates are made, these points in symptomatic care should be observed. Consultation and strict cooperation with the attending physician should be established. Where possible, pulp-involved teeth should be removed, preferably if and when a period of remission is enjoyed. Good routines of oral hygiene should be established, including pleasant and palliative mouth rinses, and of course prescribed with a view to the limitations of patient cooperation and available nursing care. The teeth should be made comfortable by placing palliative dressings in teeth with wide carious involvements, and food traps should be eliminated. A clean mouth is a great source of comfort to these patients. It should be remembered that prescription and treatment are temporizing measures for these children and the execution of complicated restorations or prosthesis is extremely trying to them and, therefore, contraindicated.

CRIPPLING HANDICAPS

Contrary to temporizing is the service requirement for that large group of patients who have a relatively long life expectancy whose chronic complaint is residual from primary causes such as the paralytic diseases, congenital defects, physical trauma, and so forth. Many of these patients complicate routine dental care because of their crippling handicaps, lack of physical stamina and low pain threshold, but they certainly deserve the best service that can be offered. Some of the most gratifying patients in the Medical Center in Boston are from this group. Almost invariably they are extremely grateful for the attention they have received because they realize that extra effort is required to serve them well. The chief reason for including them in this discussion is to point out the need throughout the country for more outpatient dental services in local hospitals.

Many of these patients require the convenience and safety of special equipment not found in the private dental offices of a given community. Equipment to accommodate patients in traction or in prone position, chest respirators, resuscitation apparatus, and the convenience of general anesthesia under trying conditions are usually available in even the smallest local hospitals. All that need be added to this equipment are a few dental instruments and mobile dental engines. Very little extra space is required, and most community hospitals would cooperate if they had the promise of a dependable dental staff. With the help of the existing nursing and medical staff, special hospital training for the dentist, though desirable, is not necessary. Many of the fine national and community programs in the fight against cancer, cerebral palsy, muscular dystrophy, heart disease, poliomyelitis, diseases of the central nervous system, physical handicaps and other chronic problems have generous programs of assisting in the financing of facilities for special services such as dental care and can be utilized in communities where service is needed but now unavailable.

It should be pointed out that the group just discussed and many others with chronic complaints such as cleft palate need more than high quality "routine" dental service. Often their need for surgical prosthetic and orthodontic care is paramount to their health and comfort. Those of the dental profession who are in public health service are well aware that comfort and appearance are major problems in the health of children handicapped by chronic disease. For this reason, they are constantly striving to encourage "complete" dental health care programs.

The child who has amorphic stained teeth as the result of sustaining metabolic or endocrine disease during the developmental years may demonstrate his most noticeable improvements in health and social attitudes after his unsightly natural dentition has been surgically removed and prosthetic replacement achieved. At the Medical Center this service is usually delayed until near adult proportions of the face have been reached—around age 14—but often in patients who have hypoplasia from resistant rickets or dentinogenesis imperfecta, dentures are fabricated long before the jaws have fully developed purely on the basis of psychological treatment, with the knowledge that they will have to be remade. Likewise, even simple orthodontic interference on a misshaped arch will improve the health of a patient remarkably because of restoration of his self-confidence.

MENTAL RETARDATION

No discussion of the chronically ill can ignore that distressing group of patients with management and behavior problems due to disorders of the nervous system and mental retardation. In the interest of discussing management and care during

dental service, inclusion should be made of those with relatively transient neuroses and the frankly psychotic, for in many ways the approach is the same. Sympathetic understanding on the part of the operator is probably the greatest single tool in the treatment of these patients. Compassion for the plight of parents even when they, too, seem frustrated and are ill behaved, as well as patience for the children themselves, is important. Conformity to routine methods of procedure must be forgotten. On occasion, an almost interminable period must be spent to achieve a very shabby restoration. Many times the repetition necessary to gain even a small amount of cooperation by the patient and parents in hygiene and caries control is discouraging. Common sense must dictate what, in the plan of treatment, is effective care to the total health of the child as differentiated from local ideals in dental care.

Cooperation and consultation with the attending physician, the psychiatrist or psychologist, and often the social worker is necessary. Frequently working through a third person such as the parent or an attendant, by communicating through her or allowing her to hold the patient's hand or even hold him on her lap, is an advantageous approach. Atypical behavior on the part of the operator such as facetiousness or nonchalance is the surest way to failure. With these patients, as with almost all patients, self-discipline, professional deportment, and purposeful objectivity on the part of the operator is expected and admired. Although restraint for purposes of discipline may sometimes be condoned, it should never be accompanied by the infliction of painful procedure or emotional outburst on the part of the operator.

SEIZURE GROUP

Although they most certainly do not belong in the group with behavior problems herein discussed, there is a small group of children classified under chronic diseases of the nervous system that should be mentioned—the seizure group. Most of these children, if they are under medical supervision, are excellent dental patients because they are well indoctrinated to routine services. Frequently dentists are apprehensive about treating such patients for fear the child may endure a convulsion while being treated. Generally, if this is a possibility, the probability is eliminated by the patient being controlled with drugs. Even if the patient should have a seizure of fit proportions, he invariably has an uneventful recovery if the usual measures for his safety and comfort are taken. These measures include loosening the clothing about the neck, placing the patient in a prone position, preferably on the floor with a pillow for the head, and wedging the mouth open by placing a rolled towel on one side of the mouth. No deviations from routine dental care need to be taken except to refrain from placing loose dental appliances in the mouth.

The drug therapy often required by the seizure group seems, on the face of it, a fine method for gaining sedative effect and behavior control on other patients. This field is a very popular one just now because of the new group of drugs popularly known as tranquilizers. No doubt before long the indications and contraindications for the intelligent use of these fine agents will be more carefully determined. At this time, however, expense, difficulty in administration, dosage control, and patient selection are still troublesome problems for the profession. In general, up to now, the patients demonstrating the most useful effect from these drugs are the ones that barbiturates or sympathetic understanding, along with the use of local anesthetics, serve equally well.

Mention should be made of the use and abuse of general anesthesia in dentistry for children presenting difficult problems in management and behavior.

Almost all of the patients for which this service is indicated are the victims of chronic diseases. Palsied or restive children, even with the highest intelligence quotient, and for whom temporizing measures are inadequate, are best served in this manner. Incompetent, psychotic, and neurotic children are frequent candidates for this service.

Occasionally, children who by neglect for one reason or another have accumulated multiple pulp involvements and widespread carious lesions and for whom infection control is important are benefited by this service. This group includes diabetics, cardiacs, those with renal and hepatic disease, or blood dyscrasias, and so forth. Such children are far better served by hospitalization for a single dental interference so that controlled massive antibiotic therapy can be administered preoperatively and postoperatively and thus eliminate multiple or prolonged risks in infection control. Severe asthmatics with ravaged mouths are occasionally served in this manner. Happily enough, the chief complaint of this group seems to be benefited by the anesthetic experience. Frequently, children facing a prolonged bed convalescence either in the hospital or at home are rendered healthier and certainly more comfortable by having all their dental treatment done under anesthesia in a single appointment.

There must be a compelling reason in total health service before the risk and expense of a prolonged anesthesia and hospitalization is resorted to. This service should never be resorted to as an expedient in behavior control where it is at all possible to protect the health of the child by chairside service. This is, by and large, an elective procedure and a good common sense weighing of the problems involved with careful consultation between parents, physician, anesthesiologist and dentist must be done before a decision is made.

As complete a service as is done at chairside can be safely rendered in this manner if the proper conditions are observed. These conditions include at least a 24-hour period of hospitalization before and after operation. The same preparation and postoperative care must be administered that would be required for anesthesia in any major surgical procedure. Speed, but not haste, during the operation is mandatory, but even under the best conditions these operations may last two or three hours. The operation should be done in a regular hospital operating room specially equipped with an explosion-proof dental engine. A complete dental instrument setup controlled by a specially trained operating room nurse is essential.

The anesthesia should be prescribed and administered under the supervision of a qualified anesthesiologist. An operating assistant is necessary—this is not a one-man job. Good surgical nursing care must be available both preoperatively and postoperatively. The greatest abuse of prolonged general anesthesia is an attempt to provide this service in private dental offices or dental clinics not attached to hospitals. Everything in the power of the dental profession should be done to discourage this.

SUMMARY

Treatment of the chronically ill child differs only from the treatment of the well child in that common sense concessions in the plan of treatment must be made with a view to the total health of the child. Personal consideration of the patient, understanding the limitations compelled by his disease, a willingness to forego conformity to usual practices, and employment of services outside the individual dentist's office will generally result in an adequate if not ideal dental health service for these unfortunate patients.

300 Longwood Avenue

The need for dental health education

Bruno Gebhard, M.D., Cleveland

It is estimated that 19 of every 20 adults in the United States suffer from caries or from periodontal disease. Next to the common cold, caries is the most common disease. Education of the public is necessary to reduce their extent and to prevent their occurrence.

Dental disease might well be labeled a "civilization disease," or a man-made disease, in which food selection, eating habits and drinking water are factors. It is, therefore, both preventable and curable. This makes personal dental health education most important; but because the public is influenced by the self appointed, unofficial "health educators" such as newspaper, magazine, radio and television advertisers (as well as the more official but sometimes not so effective influence of school and health agencies) there is confusion and apathy about dental health, with the result that personal dental self care lags far behind professional progress.

Fluoridation of drinking water is a case in point. A boon to public health dentistry, it must be implemented by education of the public before its full benefits can be realized; indeed, there is the danger that the public will be lulled into a feeling of false security unless they are informed of the role they must play in the prevention of dental disease.

If present knowledge of how dental health can be improved were disseminated, the amount of present dental ills could be reduced by one third. And this could be done by prevention of disease, which must be ranked above cure of disease.

Compared with other health subjects, dental health is in the lowest group in the public acceptance scale (table). One reason for public disinterest is that dental disease presents no direct danger to life and limb. Another reason is that the public is confused about dental health. Conflicting claims of special interest groups have served to confuse an already apathetic public. This is not to condemn advertising per se, but it must be recognized that the views of researchers and teachers are more or less crowded out and overshadowed by those coming by print, sound and picture from Madison Avenue. Once it was chlorophyll; now it is striped toothpaste—what next?

The dental profession is not blameless; it should remember that part of the present confusion results from past professional support of slogans such as, "A Clean Tooth Never Decays." One should remember also that scientific theories which were once quite valid have become obsolete, or at least controversial, within one generation. Theories once widely publicized, such as the one of "focal infection," hang on for a long time even within the dental profession.[1]

Director of Cleveland Health Museum.

1. Gebhard, Bruno. Historical relationship between scientific and lay medicine for present day patient education. Bull. Hist. M., 32:46 Jan.-Feb. 1958.

Table • Public acceptance scale for health education subjects*

I. Very high	II. High	III. Medium	IV. Low
Maternal and child health	Sex education	Cancer	Allergy
Nutrition	Mental health	Polio	Arthritis
Heart diseases	Appearances	Alcoholism	Diabetes
		Geriatrics	Dental health

*This indicates adult public acceptance. For children, dental health would be placed in group III.

Even as the public's interest in polio and cancer has increased during the past 30 years, their interest in dental health can increase. The dental profession should play a major role in achieving this.

It has been said that the most important drug the physician dispenses is himself. This is true for the dentist also, but more difficult to effect; a patient can talk during a medical examination, but not during a dental examination. Yet, because successful dentistry depends, both in the restorative and prophylactic fields (to a large degree) on the cooperation of the patient, and because the patient's cooperation depends on understanding, it is important that the dentist speak with him and answer his questions clearly and fully. The dentist has a definite role as a health adviser, and he should fulfill it.

The busy practitioner may feel that he cannot allow time to speak with patients. But he should realize that this is an important part of the treatment, that without specific personal dental health advice any therapeutic plan is incomplete, and a good long term relationship with the patient unlikely.

L. Walter Brown,[2] in his recent article "Dentistry's Zone of Silence," has covered some of the essential points of this problem. "Talking with Patients," by Brian Bird, M.D.,[3] an excellent publication written originally for physicians, can be useful to dentists, especially those who work with children. The use of visual aids in the instruction of patients has been discussed by Jack D. Carr.[4] It might be mentioned here that printed material to be distributed to patients should be carefully selected; sometimes a publication from an organization such as the Public Affairs Committee (No. 147, Your teeth—how to save them) has better reader reception than one issued by an organization associated with the profession.

Educating the patient within the dentist's office is one thing, but what of the public beyond? It is, after all, the patient and not the dentist who takes the first step in treatment and prophylaxis; it is the patient who must take the first step toward seeing the dentist. And the time lag between self diagnosis and the initiation of treatment is in direct ratio to the economic status and the degree of the patient's education. If both are of a high level, delay time is short. It lengthens in direct proportion to his lower level of income and education.

THE HOME

The home is the prime source of our health habits. The kindergarten teacher who, in response to a young mother's complaint about her child's behavior, said, "Babies might be bundles from heaven but when we get them in kindergarten they are strictly home made," was right. Basic habits are acquired in the first five years of life. For this reason, nursery schools and even expectant moth-

2. Brown, L. Walter, Jr. Dentistry's zone of silence. J.A.D.A. 55:843 Dec. 1957.

3. Bird, Brian. Talking with patients. Philadelphia, J. B. Lippincott Co., 1955.

4. Carr, Jack D. Practical applications of photography in office use. J.A.D.A. 55:822 Dec. 1957.

ers' classes are good places for the dissemination of dental information. These groups are not as easy to reach as P.T.A. groups, but they are a worthwhile and responsive audience. Local organizers of the now nationwide Children's Dental Health Week may find it advantageous to organize young mothers' clubs, especially in suburbia. Those groups, if possible, should include dentists and physicians and educators in addition to the parents.

THE SCHOOL

The days of special health lessons in the elementary schools are more or less over. Groups trying to get into the schools with special projects, regardless of worth, are frowned on by school administrators as "just another pressure group."

Teaching should be done by teachers. Teaching is, after all, a licensed profession, and educational quacks are just as bad as health quacks.

Unfortunately, teacher training in the last few decades has been dominated by the psychological and social sciences to the neglect of the basic sciences, and biological illiteracy is quite widespread in our college population. In-service training of teachers would be a solution, but it will be successful only on a voluntary basis. It has been done in the fields of cancer and heart disease; there is no reason why it cannot be done in dental health.

Faculty meetings at the Cleveland Health Museum have responded enthusiastically to classes conducted by a teacher assigned by the Cleveland Board of Education. And for 18 years an annual poster contest inaugurated by the Cleveland Dental Society and working through the public schools has had 1,000 to 1,500 entries annually. Exhibits such as those pictured in Figures 1, 2, 3 and 4 help teachers, especially of the fifth through seventh grades, to do an effective job of dental health instruction.

THE MUSEUM

Other means of reaching out to educate the layman can be used. The American public looks to museums for unbiased information; here is a ready made audience of millions of visitors, year in and year out. Health exhibits are among the top three attractions in places such as Chicago's Museum of Science and Industry. Science museums are establishing or improving their existing health exhibits; the Buffalo and the Boston science museums, as well as the Smithsonian Institution, have made recent steps in this direction.

State and university museums are effective places for permanent dental exhibits, as has been proved with the Ralph Mueller Health Gallery at the Nebraska State Museum. Some state dental societies have given financial support to museum projects; for example, the Pennsylvania Dental Association sponsored an exhibit at the Franklin Institute in Philadelphia. Cooperation between the local dental profession and the Cleveland Health Museum has been very strong since the museum's inception in 1940. Exhibits such as "The Talking Transparent Tooth" (Fig. 2), "Twice Daily" (Fig. 3), and "Sweet Saboteur" (Fig. 4), which were developed in the museum's workshop and which have been duplicated for use in other museums and institutions throughout the country, were made possible by the fact that Cleveland's professional dental groups matched money put up by the museum. Work of this kind is not limited to large metropolitan societies. One of the best jobs in this line was done several years ago at the Erie (Pa.) Public Museum. More recently, good work has been done at the Hinsdale (Ill.) Health Museum.

SUMMARY

A nationwide partnership program in dental health is needed. The participation of all strata of the laity in the im-

Fig. 1 • Suitcase exhibit, "Teeth Are to Keep," ready for demonstration in classroom. This portable exhibit has five panels; on one side, foods and nutritional elements necessary for building strong teeth are shown; on the other, there are large photographs of a visit to the dentist. The suitcase also holds models of upper and lower dentures, some actual dental instruments, and a dissected molar model

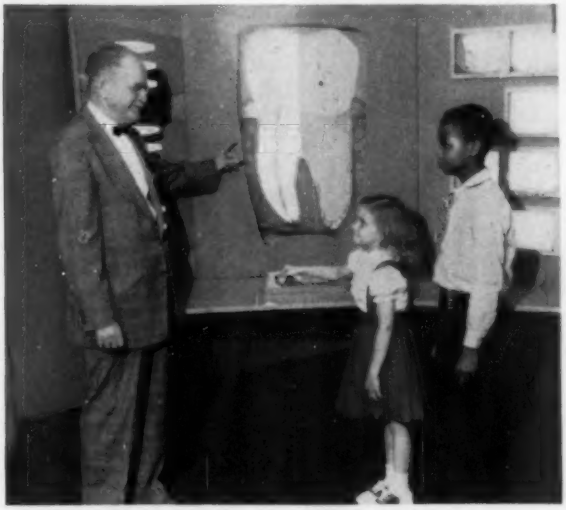

Fig. 2 • E. Carl Miller, past-president of the Cleveland Dental Society and past-president of the Cleveland Health Museum, explains "Talking Transparent Tooth" to museum visitors

provement of the nation's health, both by voluntary health organizations and through taxes, has reached an unprecedented height in this country. But it is doubtful whether dental health has had its share. National health agencies have made extraordinary progress only by accepting leading representatives of business and industry into their policy making bodies, and by securing a broad financial basis coming from the dimes and dollars of the contributing public.

It is not only money and manpower that count. What is needed first is a concise program of research and education, both professional and public. Experience of the National Tuberculosis Association over 50 years, or of the American Cancer Society with their "Seven Point Danger Signals" program, might serve partly as a pattern.

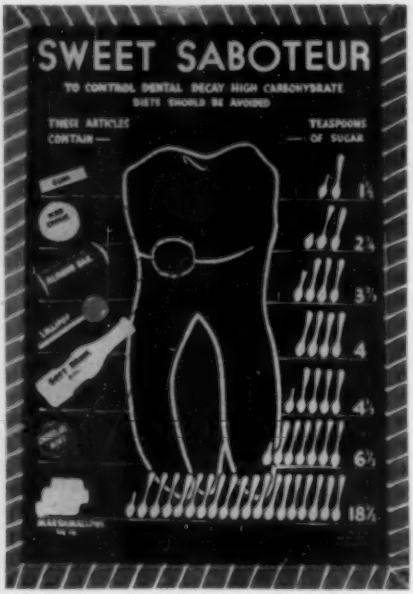

Fig. 4 • "Sweet Saboteur," a simple instruction exhibit

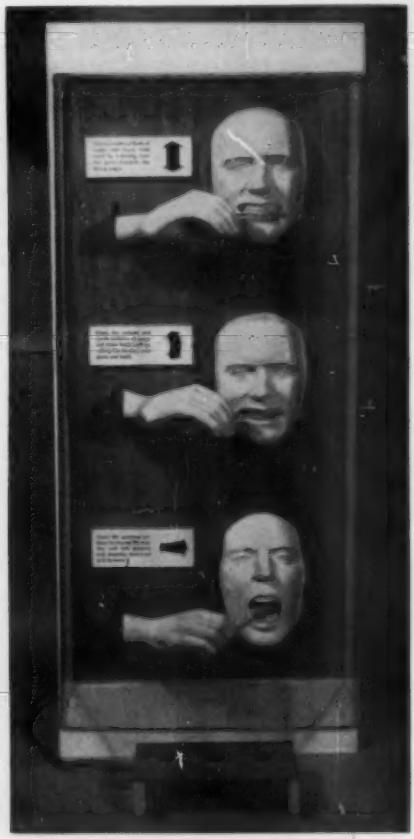

Fig. 3 • "Twice Daily," an animated toothbrush exhibit

We are aware of the progress made in American dentistry, but in order to overcome its isolation in the health field and to bring dental health on a par with the other health sciences, a new approach must be found. The practice of medicine has shifted from the doctors' offices and the homes to the hospital. Maybe dentistry has to follow. Such thoughts go beyond the topic of dental health education, but education is at its best wherever it is closely connected with actual service from person to person, by competent dentists.

Responsibility of the state society in dental education

William R. Patterson, D.D.S., Texarkana, Ark.

In a democracy, professional progress always must be based on a careful blend of scientific and cultural advancement conceived and administered by self-governed groups in the interest of the public. The tremendous advancement of the dental profession reflects the truth of this fundamental concept.

It is significant, however, that even though dentists have achieved recognition and prestige for past accomplishments, the profession must redouble its efforts to serve a public increasingly cognizant of oral disease and rightfully demanding a better health service.[1,2]

In the performance of this mission the dental practitioner of today not only must exhibit great technical skill but, more importantly, he must be instilled with the discipline of the scientific method. He can be none other than a continuous student, needing a constant review and evaluation of the flowing, changing events that mark the progress of dentistry. The most effective deterrent to socialized dentistry is an alert practitioner demonstrating professional excellence in the community he serves. It is with this proposition in mind that more comprehensive programs of continuing education must be formulated and woven into the framework of the dental profession.

At the national level, dentists have outlined carefully and legislated the academic requirements of dental schools in undergraduate and graduate training, but have placed little emphasis on the responsibilities of the state society in dental education. The need for such emphasis becomes apparent when current developments in dental science and the necessity of bringing this newer knowledge to the individual practitioner are considered. Schools of dentistry, with their overtaxed faculties and physical plants, can devise, implement and give direction to continuing education curriculums but cannot be expected to perform all of the detailed organizational and teaching functions necessary to a successful program. The many excellent types of refresher courses given annually by these schools cannot be assumed to serve the total needs of some 90,000 practicing dentists.

Thus the constituent society, being in intimate contact with the membership at the state and local level, must take greater responsibility for these activities designed not only to inform but to stimulate. The necessity for review of this problem is indicated by a recent survey

Chairman, Institute of Post-Graduate Education in Dentistry, University of Arkansas, and chairman, educational committee, Arkansas State Dental Association.

1. Patterson, William R. Professional progress through professional education. Washington Univ. D. J. 16:145 May 1950.

2. Patterson, William R. General practitioner's point of view on the correlation of the basic sciences with clinical practice. J. D. Educ. 21:12 Jan. 1957.

which revealed that only 16 of the reporting state societies carried on educational activities for their members outside of the annual session, whereas 30 states reported that they had no program in this area.[3] It is obvious that the few hours devoted to scientific sessions at the annual or district meetings are insufficient, and require supplementation.

Often what appears to be laxity or indifference to current developments on the part of practitioners is, in reality, the reflection of a lethargic state or local society whose educational program is poorly organized or nonexistent. Given the opportunity, the vast majority of dentists are eager to follow the significant developments in the art and science of dentistry.

ORGANIZATION PLAN

An effective approach to this problem, although not a panacea, is the development within the state organization of an educational plan that would be (1) thoroughly professional in character and (2) sensitive to and perceptive of the needs of the membership.

The society president and his executive body would select an education committee composed of members with proved stature and known enthusiasm for such activities. This committee would have several basic objectives. First, it would conduct periodic surveys of all continuation educational activities at the state, district and local level as to (1) types of programs, whether seminars, workshops, conferences, scientific sessions in conjunction with business meetings, or study clubs; (2) nature of programs, such as operative dentistry, oral surgery or basic sciences; (3) number of hours devoted to such activities; (4) percentage of total membership in attendance and an appraisal by program chairmen as to the effectiveness of the various activities and the degree of interest manifested by the membership in each type of presentation and (5) economic evaluation; that is, average fee or tuition, honoraria presented to clinicians and lecturers, miscellaneous operating expenses and profit or loss.

When this information is secured and evaluated it will be found that many district and local societies have effective and well-rounded continuing educational programs, whereas others show little activity. It also will become obvious that the quality of dentistry being performed in areas or communities is, almost without exception, in direct proportion to the interest and enthusiasm manifested by the societies' membership for current developments in dental art and science.

From this survey may be developed a method of operating geared to the specific requirements of the state, district or local society. This plan would provide for: (1) teams from the education committee which would consult with leaders at all levels in every section of the state with the view of uniformly developing and presenting scientific programs consistent with sound educational principles; (2) a central index maintained by the state secretary which would reveal the educational activities of the various components, lists of qualified clinicians or lecturers, their subjects, honoraria and the quality of their presentations, complete lists of refresher or postgraduate courses being presented by the various schools of dentistry; methods for the formation of study clubs devoted to the problems of a specialty or general practice; suggestions for the effective use of slides, films and other library facilities available through the American Dental Association and recognized dental educators who, on a consultation basis, periodically would evaluate and offer suggestions as to the over-all effectiveness and scope of the educational plan.

3. Hillenbrand, Harold. Criteria for evaluating the programs and administration of a state dental society. Eighth State Sec. Manag. Conf. Mimeo. Chicago, American Dental Association, 1956, p. 16.

States without schools of dentistry in many instances can utilize the resources of the Department of Institutes and Conferences as maintained by all state universities. These departments specialize in continuing education and may offer valuable assistance in the promotion and planning of scientific programs.[4]

Although the major objective of the education committee will be the formulation of scientific sessions presenting systematic reviews of the basic sciences and current advances in dental technology, some attention must be directed toward the problem of the prospective student and his introduction to the facts of dentistry and formal dental school training. It should be remembered that dentists can render no finer service than to offer guidance, encouragement and moral support to those who seek dentistry as a career. This cause may be aided materially by devoting an issue of the state journal to the progress of the profession, with particular emphasis on dental education. Such an issue, being the combined efforts of the education committee and the journal staff, in effect would become the "handbook for the practitioner and prospective student." The following, or similar, subjects would be covered in essay form:[5] (1) the profession, its obligations and responsibilities; (2) dentistry, its role as a health profession; (3) the academic standards of the profession; (4) the economic factors of a dental education; (5) the role of the dentist in community affairs and (6) the future of the dental profession.

Members would be urged to make this "special edition" a part of their permanent library to be used as a reference when counseling those who are interested in dentistry as a profession. The dental practitioner will find this service rewarding, and it will be observed that the prospective student is impressed when not only the privileges but the obligations and responsibilities of the profession are brought into sharp focus. An approach such as this has warmth, breeds enthusiasm and, of course, is superior to the cold, statistical listings of a dental school or liberal arts college catalogue.

COMMENT

It is recognized that the development of a comprehensive program of continuing education and allied activities as suggested here gives new dimension to the structure of the state society, and few will question the need for activity in this field. The prime purpose of organized dentistry at all levels is the elevation of the standards of the profession, which implies not only scientific achievement but constant adherence to those moral and ethical principles as outlined in the *Principles of Ethics* of the American Dental Association.

Success in this endeavor will come from a fusion of the dental profession's combined efforts, skillfully guided by leadership well-chosen and actively supported.

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4. Trexler, D. C. Personal communication.
5. Special edition. Arkansas D. J. Vol. 27 Sept. 1956.

Great Inventions • The two greatest inventions of the human mind are writing—the common language of intelligence—and money—the common language of self-interest. *Marquis de Mirabeau.*

Management of fear in the child patient

Granville C. Fisher, Ph.D., Coral Gables, Fla.

Fear is an emotion occurring in situations of stress and uncertainty wherein the person experiencing it sees himself as threatened or helpless and whose reaction is to resist or flee the situation out of an anticipation of pain, distress, or destruction. Resistance or flight may separate the individual from that which endangers his organic integrity.

Thus fear, basically, has biologic utility. It is a device the purpose of which is to avoid a violation of the boundaries of the organism as a whole, and of its individual cells. It is an emotional rejection of a situation, real or imagined, which threatens such a violation.[1]

Fear has been characterized as an emotional reaction; that is, an autonomic nervous system and old-brain reaction used by animals in their efforts to live safely long before the development of the cortex made possible an intelligent appraisal of a situation and the choice of appropriate action.

It might be supposed that with the high development in man of the cerebral cortex and the frontal lobes, human response to life situations characteristically would be intelligent rather than emotional. This might be the case if intelligence had replaced emotion as the basis of human response. The truth is that intelligence did not replace primitive emotion; it simply overlaid it. The autonomic nervous system has been retained. The cerebrospinal nervous system merely has been added to this; it has not replaced it.

A human being, then, still evaluates and responds on the basis of primitive, impulsive, irrational emotion. This is sometimes and in some measure qualified by the intervention of the intellectual functions of the frontal lobes.

The child is driven to rely even more on primitive emotion than the more sophisticated adult who has learned by personal experience that many of his earlier fears were exaggerated or without foundation. Whereas the dentist encounters a great deal of fear in adult patients, he may expect to see this fear intensified in the child patient, even to the stage of panic at times.

APPROACHES TO MANAGEMENT

Interest now turns to the big question, practical and theoretical, how such fear in the child patient might be managed. Data are available from a few scattered sources and the literature. This paper presents the writer's own thinking on the subject.

To begin with it is necessary to distinguish between (1) an acute fear of the situation as perceived, and (2) a chronic fear of personal failure, the latter

Presented as part of a panel discussion, "A Practical Approach to Dentistry for Children," ninety-eighth annual session, American Dental Association, Miami, Fla., November 6, 1957.

Professor and chairman, department of psychology, University of Miami.

1. Fisher, Granville C. Some psychological aspects of pain. J. Prosthetic Den. 5:15 Jan. 1955.

stemming out of a perception of the self as inadequate and ineffectual. In other words, is this particular child's reaction a fear of dentistry, or is it a fear that he will not measure up in this situation because he feels he lacks generally the necessary resources to cope with stress?

Hence it becomes clear that the personality of the child being dealt with is a most important factor: is he confident, self-reliant, trustful—or is he timid, dependent, intimidated and suspicious?

If the exhibition of fear represents a personality disorder, then the problem differs from that presented by a fear of the situational aspects of dentistry. In overcoming a fear which is caused by a personality disorder, the indicated treatment lies in the province of the clinical psychologist. There are no procedures available which will enable the dentist to bring about changes in the personality structure of a child on a short-term basis. In such instances he may be compelled to resort to technics, including total anesthesia, which might be inappropriate for the child who is not mentally nor emotionally disturbed. The limits of this paper will not permit exploration further in these directions.

For the child who is psychologically normal there are several approaches to the management of fear that have promise, and several which are contraindicated.

Force • Force is one approach that is contraindicated. If it is borne in mind that one great component of fear is a feeling of helplessness in the face of threat, it will be seen that physical coercion of a child by those of greater size and strength can do nothing but intensify his distress by impressing him with his helplessness in the situation. Recognizing at times the biologic demand for definite and drastic action, the guiding principle should be to allow the child self-direction and freedom of action as far as possible; or allowing it to act in such a manner that it presents a picture of self-direction. For example: although the child has not actually enunciated it, the mother, in his presence, might say, "Johnny has decided to see the dentist." At the dental office she might say to the receptionist, "My son wishes to see Dr. Williams." The dentist can remark, "I'm glad, Johnny, you decided to have this work done. Tell me at which tooth you wish me to look."

As far as possible the child should be encouraged in self-reliance and in assuming responsibility for his own direction. The problem is not just the dental work which must be done now. The aim is the creation of attitudes in the child which will make him accept dentistry throughout his life. Having dental work performed when the reluctant child is overwhelmed by force may generate such intense panic that he will be forever emotionally set against it and, once he reaches an age where such force can be applied no longer, he may avoid going to the dentist to his own great damage. Under these circumstances the dentist may have saved a tooth, but lost the individual.

Denial • Denial that the fear is there, or should be there, is contraindicated because the child may be lead to repress it. But repression does not eliminate fear. To say that fear is not there when it is there is a contradiction between verbal testimony and actual experience which often results in internal confusion. To say that the child ought not be afraid when he is afraid constitutes a rejection of the self as perceived. It is to say in effect that the patient is inadequate, made of inferior stuff, and this multiplies the distress of the child. Now, not only is he afraid, but he is afraid to be afraid.

The child should feel no disgrace in being afraid. Fear is normal and natural. It has survival value, and efforts toward its elimination should not be directed toward fear, but toward irrational fear.

Contraindicated are efforts to talk or argue the child out of his fear of dentistry.[2] This usually intensifies it. If it is remembered that fear is an emotional reaction, it should be realized that the intellectual approach is not very effective. Even worse is the effort to shame or ridicule the child into abandoning his fear.

It is better if parents and dentists readily admit that they, too, are afraid at times and sometimes have been afraid even of the dentist. This permits the child to perceive himself as one of them, rather than as a freak, coward, or outcast. It helps to establish communication and rapport, making easier any efforts to aid the child accept dentistry.

Whatever methods are used which cause the child to repress his fears may give rise to problems far more serious than the one being dealt with.

Feeling of Safety • Since the child's security realistically has been and is tied up with the mother or father, the presence of one of these parents in the dentist's reception room may be indicated, according to the age and disposition of the child. The guiding principle here is that the child should never feel abandoned by those to whom he looks for protection and security.

Distraction • Talking to the patient about things which interest him is often an effective distraction. Music, radio, movies on the ceiling and television no doubt will provide increasingly effective distractions, as will tape recordings of stories appropriate to children of various ages.

Positive Conditioning • Associating with the rejected experience something that the child accepts and enjoys may result in acceptance of the experience. Balloons and other little knickknacks appealing to children are utilized for this purpose by many dentists.

Positive conditioning[3] can be accomplished also by treating the child with respect, and according to him a certain dignity, personal pleasantness and cordiality. The dentist should let the child know that he likes him. Such measures provide symbolic satisfaction which can render dentistry emotionally acceptable.

Relaxation • Relaxation of the muscles has a tendency to reduce the intensity of fear.

Familiarization • When it is recalled that fear is often generated by the unknown, the unfamiliar, and the unexpected, it indicates that acquainting the child with dentistry can aid in reducing and managing his fear. Describing and explaining on a purely verbal level has not proved effective with the young child. Play is his natural medium of expression.

The parents may "play dentist" with the child prior to a visit to the office, simulating some of the procedures preliminary to the actual experience. Other types of exploratory experiences should aid, such as a trip to the dentist's office just to sit in the chair, asking and answering questions, and so forth.

The first appointments should be as painless and as free from stress as possible, so that the child will have an experience of coping successfully with the situation. This has the effect of strengthening his inner resources for handling such situations. The more stressful later appointments then will be met with greater self-assurance and an expectation of personal success in coping with them. This expectancy or mental set will make such success more likely.

It goes without saying that in discussing dentistry in the home, gruesome references should be avoided. The mental images generated by vivid descriptions of

2. Hagman, E. R. A study of fears of children of preschool age. J. Exp. Educ. 1:110 Dec. 1932.

3. Jones, M. C. The elimination of children's fears. J. Exp. Psychol. 7:382 Oct. 1924.

pain and torture create frightening expectations of pain and catastrophe. The positive and beneficial aspects should be emphasized in order to create favorable attitudes of acceptance.

The technic of familiarization is also used in preparing the mother for painless childbirth. The preliminary exploration of the coming event allows the individual to develop attitudes of emotional acceptance of the real experience. The unknown tends to be fear-provoking. To say that familiarity breeds contempt is an exaggeration, but familiarity does modify emotional intensity. Psychodrama utilizes this principle to reduce anxiety in disturbed persons through role-playing simulating the situations of stress. Training technics in the Armed Forces duplicating combat conditions as closely as possible, even to the use of live ammunition, prepare the trainee to accept the conditions of actual combat with much less anxiety than otherwise would be the case.

Social Imitation • Imitation is perhaps the most effective method of all.[8] It is, of course, one way of familiarizing the child with a situation. When the parent has a dental appointment, it sometimes may be wise to allow the child or children to go along. They might even enter the operating room long enough to watch a parent be seated and prepared. Several such experiences may go a long way toward creating an accepting attitude on the part of the child.

School movies showing dentistry in action with child patients should aid in a favorable preparation. The individual dentist might have movies especially designed for children of various ages, presented in an entertaining manner, available for parents of children who are seeking appointments. The parents might show these in the home.

SUMMARY

This discussion has included the relative merits of various technics used to manage the fear of the child patient; force, denial, a feeling of safety, distraction, positive conditioning, relaxation, familiarization and social imitation. It appears that there are no simple or specific solutions; that interested persons still can speak only in terms of principles and trust to individual initiative and ingeniousness to devise and report practical applications of these principles. Not being a dentist, the writer would be presumptuous to suggest specific applications. In presenting a few principles he has tried to furnish some investigative perspectives to those with sufficient energy, resources and audacity to put them to the test.

Individual success in coping with child patients is somewhat dependent on the development of competence with such problems. As in other learning situations, such competence is arrived at largely through elimination of inappropriate responses. The child's skill in coping with dentistry involves the elimination of inappropriate attitudes and responses toward the situation and toward himself. Some children will learn faster than others. Some parents and some dentists are better tutors than others. These differences will make for great variation in the responses and reactions to dentistry among individual children.

Diagnosis • Diagnosis holds the first rank in all sciences and it is the most difficult part; without an exact and precise diagnosis, theory is always faulty and practice often incorrect. *Guillaume Dupuytren (1777-1835).*

Effects of drinking solutions containing metallic ions above and below hydrogen in the electromotive series on dental caries in the Syrian hamster

Joel Wisotzky, D.D.S., Ph.D., South River, N. J., and John W. Hein,† D.M.D., Ph.D., New Brunswick, N. J.*

The purpose of this work was to determine the effects of a number of elemental metallic ions on dental caries in the Syrian hamster. In dental caries, changes are being dealt with that occur in a tissue whose principal constituents are simple inorganic compounds bound in a spatial configuration characteristic of hydroxyapatite. Lattice structures of this type permit a rather wide number of substitutions between ions present in the lattice and ions present in a fluid equilibrating with the lattice. Since many metallic ions have been spectrographically detected in dental enamel and many metallic ions have been reported to influence the rate of enamel solubility, it becomes natural to wonder how elements in their basic ionic states will affect the process of dental caries occurring in these hard structures. The discovery that the fluoride ion, when present in a water supply in a concentration less than one milliequivalent per liter, can decrease the caries incidence in both humans and experimental animals provides an added incentive to learn the effects on dental caries of other elemental ions at low concentrations.

There is another distinct advantage to testing the effects of simple inorganic ions on dental caries. Since there is a relatively large body of information available regarding the chemical behavior of a simple inorganic ion, testing such a particle for its effects on a poorly understood process such as caries often can bring forth observations which can be translated into well known properties associated with the ion, and thus may lead indirectly to a better understanding of the process itself.

In order to make a comparison of the effects of the metallic ions on caries more meaningful, it is advisable to test the ions under similar laboratory conditions, at reasonably comparable solution strength, ideally at the same equivalence, on genetically similar animals and under a dietary regime which is consistent with regard to composition and physical form.

This is taken from part of a thesis submitted at the University of Rochester in partial fulfillment of requirements for a Ph.D. in the department of pathology, School of Medicine and Dentistry.

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†Division of dental medicine, research and development department, Colgate-Palmolive Co., located at and in cooperation with Rutgers, the State University of New Jersey.

METHODS

All experimental groups, consisting of 10 to 12 animals, had a control group composed of animals which were littermates and of similar sex as the animals in the experimental group. In many instances it was possible to arrange the litter distribution so that two experimental groups and a common control group of the same size were made up from the same litters. This permitted a cross-comparison between the two experimental agents. Some metallic ions were tested on both male and female hamsters. Males were always completely segregated from the females, and each sex had its own control group composed of littermates of the same sex. Results on males and females were treated statistically as separate experiments. These precautions were taken because it is evident from the literature that the female caries rate frequently differs from the male caries rate in the hamster.

In most instances the salts used in the drinking solutions were selected because of the position of the metal in the electromotive series. The aim was to test metallic ions above and below hydrogen (which occupies the zero point of reference in the electromotive series). The "above hydrogen" series tested the following cations: lithium (Li^+), potassium (K^+), magnesium (Mg^{++}), lead (Pb^{++}), cadmium (Cd^{++}).

The metallic ions chosen to explore the region below hydrogen in the electromotive series were palladium (Pd^{++}), platinum (Pt^{++++}), and gold (Au^{+++}). Excellent data are now available in the literature about the effect of the copper (Cu^{++}) ion,[1] and therefore information would be available about five ions above hydrogen and four ions below hydrogen in the electromotive series.

For purposes of comparison, it was felt that the metallic ions should be present at the same equivalent concentrations in the experimental solutions. Thus all metallic ions would be represented with the same concentrations of active valence positions in a unit volume. All solutions, except for lead acetate, cadmium sulfate and gold chloride, were made up at a 1 milliequivalent per liter concentration in regard to the metallic ion in the salt. In the testing of lead and cadmium, it was felt that the toxicity of the metallic ions might be too great at the one milliequivalent level. In the testing of gold, it was felt that allergic manifestations possibly could occur at the one milliequivalent level. Therefore, the lead, cadmium and gold solutions were started at a 0.5 milliequivalent per liter level. At this concentration, cadmium proved too toxic, and the level was reduced in the middle of the experiment to a 0.25 milliequivalent concentration. All other solutions proved nontoxic and were maintained in the original concentrations.

The anion or negative radical component of the salt was chosen to make the salt as soluble as possible. However, bromide (Br^-),[2] nitrate (NO_3^-)[3] iodide (I^-),[3] and phosphate ($PO_4^{\equiv}$)[3] ions were avoided deliberately as negative members of the salt because of evidence appearing in the literature which indicates a possible caries effect due to these substances.

Sulfates apparently exerted little effect on rat caries when employed as a sodium sulfate salt in concentrations up to 2,000 ppm in the drinking water.[3] There is also no experimental animal evidence to indicate a caries effect due to chloride or acetate. Therefore, sulfate and chloride salts were utilized in the experiment except for the lead and potassium metallic ions. Lead sulfate is not soluble enough to yield the concentration of lead ions desired. It was decided, therefore, to use

1. Hein, J. W. Effect of copper sulphate on initiation and progression of dental caries in the Syrian hamster. (Abst.) J.D.Res. 32:654 Oct. 1953.

2. Sognnaes, R. F. Experimental rat caries: effect of bromide on experimental rat caries. J.Nutrition 39:147 Oct. 1949.

3. McClure, F. J. Observations on induced caries in rats. VI. Summary results of various modifications of food and drinking water. J.D.Res. 27:34 Feb. 1948.

the acetate salt because it is the most soluble salt of lead, being roughly 46 times more soluble than the chloride; furthermore, basic acetate salts are also reasonably soluble. This was considered an advantage in this experiment because in an environment such as hamster saliva a pH of 9 or above often exists. An acetate salt of potassium was used to maintain the practice of having at least two metallic salts with the same negative groups, this serving as an added check on the negative group. The potassium permanganate solution was included in order to observe the effect of a negative radical possessing potential oxidizing power.

All animals were given the following cariogenic diet as the sole source of food: whole powdered milk, 30 per cent; whole wheat flour, 30 per cent; powdered alfalfa, 4 per cent; sodium chloride, 1 per cent, and sucrose, 35 per cent.

Experimental groups drank solutions of the salts being studied *ad libitum*. All control groups drank distilled water *ad libitum*. All salts were dissolved in water which was first distilled and then filtered through a resin ion exchange column. All animals were started on the experimental program when 25 to 29 days of age, with the exception of the animals drinking the potassium acetate solution and their controls; these latter animals were from 32 to 35 days old at the start of the experiment.

Animals were kept on the diet and solutions until a periodic examination of the control animals showed a caries rate of sufficient magnitude to assure good scoring. The heads were fixed in neutral Formalin. At a later date the heads were stripped of flesh and the teeth scored under the binocular microscope, using the method of scoring developed by Keyes.[4] All animals that died prior to the date of termination of the experiment were not scored. All the pertinent experimental information, along with the numerical results and their statistical evaluation, are presented in the table. A standard student "t" test with Bessel's correction for small samples was utilized for statistical analysis of the data.

RESULTS

The "Above Hydrogen Series" • It is noted that the monovalent cations Li^{+} and K^{+} did not affect caries significantly in the hamster at the concentration tested, whereas the bivalent cations Mg^{++} and Pb^{++} accelerated dental caries in the male. No cation in this series significantly inhibited caries.

The "Below Hydrogen" Series • Pd^{++} did not affect the caries scores. The means are almost identical with those of the controls.

Pt^{++++} accelerated caries to the point of almost complete destruction of the dentition. The carious destruction was so severe it recalled the caries picture in desalivated animals.

Au^{+++}, in distinct contrast to Pt^{++++}, caused a strong inhibition of dental caries. Whereas the control animals of the gold experiment had a rather active caries incidence, none of their littermates drinking the gold solution showed any teeth with severe carious destruction. The few carious lesions found in animals in the gold experimental group were small and confined to pits. This highly significant inhibition becomes even more significant in light of the fact that it occurred in the male animals. None of the other nine agents showed any real ability to inhibit caries in the male. It is odd to uncover such extremely opposite effects on the caries incidence by the platinic and auric salts, since both metallic ions show many similar chemical properties.

DISCUSSION

It may be concluded, at least from this series of experiments, that inhibition of

4. Keyes, P. H. A method of recording and scoring gross carious lesions in the molar teeth of Syrian hamsters. J.D.Res. 23:439 Dec. 1944.

Table • The effects of solutions of metallic salts on dental caries in the Syrian hamster

Salt tested	Sol. conc. mEq./L.*	pH of sol.	Days on sol.	No. animals scored	Mean caries score, on all molar teeth†	Stand. error	"t" value
$Li_2SO_4 \cdot H_2O$	1 mEq.	6.20	84	11♂	67	± 9.2	0.45
Control	H_2O		84	10♂	61	± 9.6	
$Li_2SO_4 \cdot H_2O$	1 mEq.	6.20	98	12♀	41	± 7.5	0.75
Control	H_2O		98	7♀	50	± 9.9	
$MgSO_4 \cdot 7H_2O$	1 mEq.	6.25	84	11♂	87	± 9.1	1.9
Control	H_2O		84	11♂	62		
$MgSO_4 \cdot 7H_2O$	1 mEq.	6.25	98	10♀	60	± 6.2	1.9
Control	H_2O		98	10♀	43		
$CdSO_4$	½–¼ mEq.	5.80	84	10♂	94	±11.5	0.55
Control			84	10♂	85	±11.5	
$CdSO_4$	½–¼ mEq.	5.80	98	6♀	98	±19.2	1.1
Control			98	6♀	68	±19.2	
$Pb(C_2H_3O_2)_2 \cdot 3H_2O$	½ mEq.	5.85	84	11♂	118	±11.0	2.02
Control	Distilled H_2O		84	10♂	85	±11.5	
$Pb(C_2H_3O_2)_2 \cdot 3H_2O$	½ mEq.	5.85	98	8♀	85	±16.6	.68
Control	Distilled H_2O		98	6♀	68	±19.2	
$KMnO_4$	1 mEq. MnO_4^-	6.90	84	11♂	67	± 9.2	.40
Control	Distilled H_2O		84	10♂	61	± 9.6	
$K(C_2H_3O_2)$	1 mEq.		140	9♀	75	±15.4	1.8
Control	Distilled H_2O		140	9♀	115	±15.4	
$PtCl_4 \cdot 2HCl \cdot 6H_2O$	1 mEq.	5.5‡	124	12♂	161	±14.0	3.61
Control	Distilled H_2O		124	10♂	86	±15.3	
$PdCl_2 \cdot 2H_2O$	1 mEq.	5.5‡	124	10♂	86	±15.3	.01
Control	Distilled H_2O		124	10♂	86	±15.3	
$HAuCl_4 \cdot 3H_2O$	½ mEq.	5.0‡	98	10♂	17	±10.2	5.48
Control	Distilled H_2O		98	12♂	93	± 9.3	

*Milliequivalent per liter.
†Keyes method.
‡Brought to pH with 0.1N NaOH.

dental decay is not a usual property of a metallic ion; that some polyvalent metallic ions appear to aggravate the carious process, rather than retard it; that caries inhibition is not a property common in all metallic ions below hydrogen in the electromotive series, that is, in metallic ions which are easily reduced; that strong inhibitory action may be confined to a specific family of ions in the "below hydrogen group."

The work of Hein[1] establishes the definite inhibiting tendencies of the Cu^{++} ion on hamster caries. Since experimental conditions in his studies of copper were similar to those reported in this paper, results from both can be compared. Interpolation between the levels of copper sulfate tested by Hein predicts a caries inhibition by the Cu^{++} ion at a concentration less than one milliequivalent per liter.

It is interesting to note that not only do gold and copper occupy positions below hydrogen in the electromotive series, but both are often grouped together along with silver in a grouping referred to as the gold-silver-copper group. All members in this group have certain common features in atomic architecture, such as one electron in the outermost valence shell, and this results in many common physical and chemical properties.

Since the metallic ions of gold and copper were found to inhibit hamster caries, it would be interesting to determine if the silver (Ag^+) ion also inhibits hamster caries. If it does—and there is evidence in the literature to suspect that the silver ion does tend to inhibit caries[5]—then all

5. Schultz-Haudt, S.; Taylor, R. G., and Brudevold, F. Effect of topical application of silver nitrate on dentin. J.D.Res. 32:681 Oct. 1953.

members of the gold-silver-copper group would have this feature of caries inhibition in common.

It must be pointed out that platinum and palladium are also often grouped together with nickel in another grouping, and that the properties of platinum, palladium and nickel are similar in many respects to that of the gold-silver-copper group. Yet neither platinum nor palladium showed an inhibitory effect on dental caries.

It might be interesting to concentrate on the problem of why the platinic ion and the auric ion in comparable salts had such extremely opposite effects on dental caries. An answer to this question might provide basic information as to the nature of dental caries.

SUMMARY

1. Salts containing the following metallic ions were administered in the drinking water to determine if any correlation existed between a metal's position in the electromotive series and its effect on dental caries in the Syrian hamster: Li^{+}, K^{+}, Mg^{++}, Cd^{++}, Pb^{++}, Pt^{++++}, Pd^{++} and Au^{+++}. The experimental results would tend to indicate that the position of a metallic ion in the electromotive series is not an accurate index as to how the metallic ion will affect experimental caries.

2. Auric chloride was found to be a potent inhibitor of dental caries in the Syrian hamster.

3. Platinic chloride accelerated caries to the point of almost complete destruction of the dentition.

4. Magnesium sulfate and lead acetate tended to cause an acceleration of caries in male hamsters.

5. Lithium sulfate, potassium permanganate and palladium chloride exhibited no effect on caries incidence in the hamster.

6. Cadmium sulfate proved to be the most toxic of the salts tested. This salt at 0.25 milliequivalent per liter caused fur bleaching and severe anemia in the animals. Although the caries rate increased in both male and female hamsters on this solution, the severe systemic effect and the loss of animals because of the toxic effects of the agent makes it impossible to evaluate the caries effect of the salt.

7. Potassium acetate could not be shown to affect the caries rate significantly.

8. On the basis of the aforementioned findings, it is concluded that strong caries inhibition is not a common property of metallic ions but may be confined to certain groups of elements, one of these being the gold-silver-copper group. Also, that metallic ions can accelerate caries and, therefore, any analysis of the mineral content in diets in relation to dental caries must include the possibility of a trace element accelerating as well as inhibiting caries.

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Health and Fitness • Health cannot be dissociated from the particular conditions under which man has to function. It implies fitness to his total environment. ***Réné J. Dubois.***

The temporomandibular joint and occlusion

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Occlusion can be defined as the contacting relation between the biting surfaces of the maxillary and mandibular teeth. Of the many factors influencing occlusion, the temporomandibular joint is the most important since it is the connecting structure between the maxillary and mandibular teeth.

A clear understanding of the temporomandibular joint and its influence is necessary in the practice of modern dentistry. Unfortunately, many dentists exhibit no interest in the temporomandibular joint. It is associated in their minds with neurotic patients, vague complaints and abnormal conditions. They fail to comprehend the connection between the mechanical relations of the joints and the teeth. The importance of this relationship has been well established. Granger[1] recently wrote that the success or failure of our learned profession as a health service will rise or fall on our ability to deal with the mechanical relations of the temporomandibular joint to the functional relations of the teeth. Orban[2] stated that "an harmonious relation of the temporomandibular joint and the occlusal surfaces of the teeth is the most important biologic, functional requirement for a normal masticatory organ."

The basic principles for attaining this harmony between all parts of the masticatory system were presented in 1935 by Schuyler.[3] Through the years, however, this goal of complete functional harmony between all parts of the masticatory system has been lost to view. Occlusal equilibration as it is actually practiced has come to place almost complete emphasis on the establishment of harmony between the upper teeth and the lower teeth, meanwhile ignoring or overlooking the fact that the patient has two temporomandibular joints and that a true harmonious relation has not been achieved until the teeth have been brought into harmony with these joints and their musculature.

FACTORS CONTROLLING MANDIBULAR MOVEMENT

Mandibular movement is controlled by two factors; the first is the temporomandibular joint and its musculature, the second is the teeth and their cusps or inclined planes. The temporomandibular joint by itself will guide the jaw to certain definite positions; likewise, the teeth

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The opinions or assertions contained in this article are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

Captain, Dental Corps, U.S. Naval Dental Clinic.

1. Granger, E. R. Some new developments in restorative dentistry for the general practitioner. J. South. California D.A. 25:25 Sept. 1957.

2. Orban, B. J. Biologic basis for correcting occlusal disharmonies. J. Periodont. 25:257 Oct. 1954.

3. Schuyler, C. H. Fundamental principles in correction of occlusal disharmony, natural and artificial. J.A.D.A. 22:1193 July 1935.

by themselves will guide the jaw to certain definite positions.

TEMPOROMANDIBULAR JOINT AND MANDIBULAR MOVEMENT

The influence in mandibular movement of the temporomandibular joint and its musculature can be studied best in the edentulous jaw. The edentulous patient can move his jaw freely in any direction he desires, and the only guiding influence is the temporomandibular joint and its musculature. With a tracing stylus attached to the maxilla and a recording plate to the mandible, the movement of the mandible is scribed in the classical two-dimensional arrow-point or Gothic arch tracing. The direction of movement in making this tracing is dictated only by the temporomandibular joint and its musculature. The apex of the tracing is centric relation; the sides of the tracing are varying degrees of lateral relations. The apex of the tracing and every point down each side of the tracing are dictated only by the joint and its musculature. When an opening or third dimensional movement such as a cuspal incline is incorporated into the lateral movements, similar border positions are reached as directed by the temporomandibular joint.

TOOTH INFLUENCE IN MANDIBULAR MOVEMENT

Obviously, the influence of the cusps or inclined planes of the teeth in mandibular movement must be studied in the patient with natural teeth. When the patient brings the teeth of one arch into maximum tight contact with the teeth of the opposing arch, the intercuspation of the teeth determines the exact relation between the maxilla and the mandible. This is the centric position as determined by the teeth. When a lateral excursion is performed with the teeth in contact, the cusps of the teeth guide the jaw to the lateral position of maximum intercuspation. All positions of intercuspation are determined by the tooth factor.

OCCLUSAL HARMONY

When the jaw positions prescribed by the temporomandibular joint are identical with the jaw positions prescribed by the teeth, the temporomandibular joint and the teeth are in harmony in this respect.

When these jaw positions do not coincide exactly, the disharmonies present indicate trouble because of the undue stresses placed on both the joints and the teeth. Eventually one or the other will break down. If the temporomandibular joint is the stronger, the teeth eventually will loosen and be lost. If the supporting bone of the teeth is the stronger, the temporomandibular joint eventually will show signs of trauma.

OCCLUSAL PROBLEM

It is evident then that the occlusal problem is (1) to recognize when the jaw positions prescribed by the temporomandibular joint differ from those prescribed by the teeth and (2) when found, to correct the difference. It is obvious that the temporomandibular joint cannot be corrected to fit the teeth, therefore the teeth must be reshaped to meet in simultaneous contact in the basic positions prescribed by the joint. After that is done, provision must be made for multidirectional, free-gliding, excursive movements throughout the entire range of possible occlusal contact.

ANALYSIS OF CENTRIC POSITION

The occlusion must be analyzed to determine whether there is harmony between the joint and the teeth in the centric position. The patient is instructed to close his jaws slowly from the relaxed rest position to the point of initial tooth contact and to hold the teeth in this posi-

tion. Correctly done, this is the centric position prescribed by the temporomandibular joint. While he carefully views the teeth in this position, the dentist instructs the patient to exert a heavy closing force and he notes whether the mandible and its teeth slide to another position and into closer contact with the upper teeth. Correctly done, this is the centric position prescribed by the teeth. If there was no shifting or sliding of the jaw and teeth when this biting force was exerted, the centric positions prescribed by the joint and by the teeth are identical and the joint and the teeth are in harmony in this respect. If there was a shifting of the jaw and teeth, the centric positions are not identical, interceptive contacts are present and the teeth are not in harmony with the temporomandibular joint. This condition must be corrected by reshaping the prematurely contacting areas until the two positions do coincide.

ANALYSIS OF LATERAL POSITIONS

The occlusion also must be analyzed to determine whether there is harmony between the temporomandibular joint and teeth with the jaw in the lateral position. The patient is instructed to relax the temporomandibular joint and, with the teeth contacting lightly, make a right lateral excursion. The cusps of the teeth will guide the mandible to that right lateral position at which the teeth intercuspate to the maximum. This is the right lateral position prescribed by the teeth. Next the patient begins with his jaw in the rest position and, keeping the teeth separated slightly, makes a right lateral movement and then closes until the teeth contact lightly. The jaw is now in the right lateral position prescribed by the temporomandibular joint. If the teeth intercuspate to the maximum exactly as they did when the jaw was in the position to which the teeth guided it, the teeth and the temporomandibular joint are in harmony in this position. If the teeth do not intercuspate perfectly but rather incline planes make interceptive contact against incline planes, the teeth and the temporomandibular joint are not in harmony (Fig. 1). This condition must be corrected by reshaping the prematurely contacting areas until the two positions coincide. In a similar manner, the left lateral positions are analyzed.

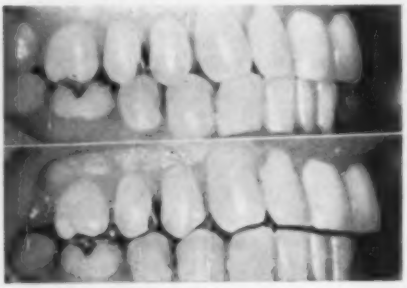


Fig. 1 • Upper half: Jaw relation prescribed by teeth. Tight intercuspation of teeth guides jaws to this position. Comparison with contacting position of teeth in lower picture shows mandible is in slightly protrusive position. Lower half: Jaw relation prescribed by temporomandibular joint. In this position teeth contact on inclined planes and closing force will slide mandible forward to intercuspating tooth-prescribed position

DIFFICULTY OF ANALYSIS OF JAW POSITIONS

Correct analysis of jaw positions is seldom easy. Discrepancies or differences in the positions prescribed by the teeth and the temporomandibular joint are often difficult to detect. Many patients have difficulty moving the jaw in the desired direction and to the desired position. The fact that interceptive contacts are actually two inclined surfaces that contact each other makes it virtually impossible for the patient to hold the initial point of tooth contact. A sliding of some degree invariably takes place which results in an incorrect occlusal diagnosis.

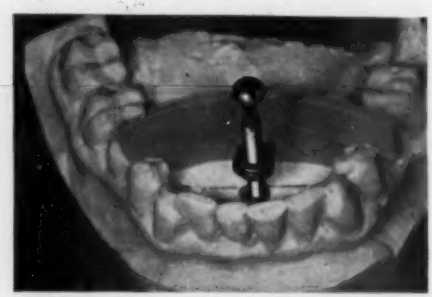
SIMPLIFICATION OF ANALYSIS OF JAW POSITIONS

Simplification of analysis of jaw positions has been brought about through the development of a simple appliance, individually made for each patient. It is called an occlusal coordinator since its use simplifies the coordination of the teeth with the temporomandibular joint. The appliance allows the mandible to follow the movements prescribed by the temporomandibular joint, meanwhile freeing the movement from the influence of the teeth. Use of it simplifies the control of jaw movement and the recognition of discrepancies in the jaw positions as prescribed by the temporomandibular joint and the teeth.

CONSTRUCTION OF OCCLUSAL COORDINATOR

The coordinator consists of two parts, each made of quick setting resin on casts of the patient's upper and lower teeth. The mandibular part of the coordinator holds a bearing screw and is made by (1) building a dam of wax extending from the interproximal space between the right bicuspids, across the lingual area to the corresponding space between the left bicuspids, (2) waxing a nut and bolt in an upright position immediately lingual to the anterior teeth (Fig. 2, left); (3) pouring a mix of creamy consistency of quick setting resin to fill the dam level with the incisal edges of the anterior teeth, embedding the nut and covering the lingual cusps of the first bicuspids, and (4) when set, freeing the bolt and trimming to fit the patient's mouth but maintaining a thin layer over the lingual cusps of the first bicuspids for vertical support. The top of the bolt is then rounded and polished (Fig. 2, below left).

The maxillary part of the coordinator is a flat plane against which the rounded end of the lower screw can slide or rest. It is made in a manner similar to the lower part but without the nut and bolt



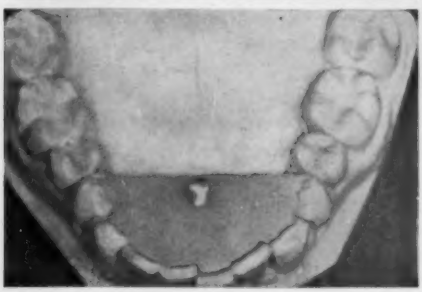


Fig. 2 • Left: Mandibular part of coordinator. Wax dam extends from interproximal space between right bicuspids to corresponding space between left bicuspids. Nut and bolt are waxed upright immediately lingual to anterior teeth. Creamy consistency of quick setting resin is poured to fill dam level with incisal edges of anterior teeth, covering lingual cusps of first bicuspids and embedding nut and bolt. Below left: Mandibular portion completed. Resin trimmed short of incisal edges, thin layer over lingual cusps of first bicuspids for vertical support. Bolt freed, end rounded and polished. Below right: Maxillary part. Poured in manner similar to mandibular part, trimmed level and smoothed

and only to a height sufficient to cover about 2 mm. of gingival tooth structure. When set, it is trimmed level and smoothed against a flat abrasive surface (Fig. 2, below right).

USE OF COORDINATOR IN DIAGNOSIS OF OCCLUSAL HARMONY

The fit of the occlusal coordinator is adjusted so it does not interfere with the patient closing his teeth in the centric position. The threaded screw can easily be raised or lowered to vary the amount of closing allowed the mandible and its teeth. With the coordinator in position and the screw raised to keep the teeth out of occlusion, the patient can move his jaw freely with only the temporomandibular joints and their musculature dictating the direction. The influence of the teeth in jaw movement is completely removed. In effect, the patient is edentulous. In a lateral excursion, the jaw moves down the side of the Gothic arch tracing at that particular opening, guided only by the temporomandibular joint.

By lowering the screw to the correct height, the initial contact between the inclined planes of the maxillary and mandibular teeth in the lateral movement can be located. This point of initial contact can be held since the bearing screw absorbs the load and prevents any further closing (Fig. 3). This is the lateral position prescribed by the temporomandibular joint. The removal of the closing force neutralizes all tendency of the inclined planes to shift the jaw from this joint-prescribed position to the tooth position. Without the appliance in the mouth, the inclined planes quickly shift the jaw to the tooth position and recognition of positional discrepancies is difficult.

With the coordinator in place and the jaw in the joint-prescribed lateral position of initial tooth contact, the teeth should intercuspate and contact exactly as they do in the corresponding tooth-prescribed position; that is, without the appliance in the mouth. If the tooth intercuspation and contacts are identical, the joint and the teeth are in harmony in this position. If the tooth intercuspation and contacts are not identical, the joint and the teeth are not in harmony and equilibration is indicated to remove the discrepancies.

Fig. 3 • Usage of coordinator. Coordinator in mouth with bolt adjusted to point of initial contact between inclined planes of upper and lower teeth with jaws in position prescribed by temporomandibular joint. Bearing screw absorbs load and prevents any further closing and the tendency of inclined planes to shift jaw from this position to one prescribed by teeth

USE OF OCCLUSAL COORDINATOR IN EQUILIBRATION

The occlusal coordinator simplifies the problem of reshaping the teeth to harmonize with the temporomandibular joint. When equilibration is attempted without this appliance, the teeth are used as the guiding factor and the jaw is moved to the tooth-prescribed position. A carbon or wax grinding mark thus obtained may be an incorrect one. The teeth may be ground to fit together tightly but any disharmony existing between the teeth and the temporomandibular joint will not necessarily be corrected. Instead of removing the original disharmony, it will very likely have been prepetuated while the efficiency of the tooth factor in the movement has been increased.

The screw is adjusted to that height which permits initial contact between the teeth in the lateral position, and a grinding mark is obtained by using carbon paper or wax. Since the sliding force of the inclined planes has been neutralized by the coordinator, the grinding mark obtained is free of distortion due to sliding. After the mark has been ground, the screw is lowered slightly to permit further jaw closure. The marking and grinding is repeated with all tooth reshaping done on the buccal cusps of the upper teeth and on the lingual cusps of the lower teeth in accordance with the familiar BU-LL rule.

A continued correction as indicated by this appliance will result in a reshaping of the teeth so they will occlude in the lateral position prescribed by the temporomandibular joint. After the teeth have been corrected to this lateral relation, the pin is lowered until the teeth contact on their inclines about midway between the full lateral excursion and the centric position. Repeated correction is made at various stops down the incline planes of the cusps until the centric position is reached. By careful adjustment of the pin, a carbon mark of interceptive centric contact can be registered on a tooth and at the same time the pin will take up the closing force and prevent any sliding and marking of teeth other than of those in interceptive contact. Protrusive relation is corrected next, followed by adjusting down the inclined planes to centric relation. After this procedure has been carried out, the teeth are smoothed and polished.

It should be understood that the coordinator is used solely as a stop to limit the amount of closing the mandible is allowed, which permits the temporomandibular joint to prescribe the movements of the mandible and keeps this movement entirely free from the influence of the teeth.

SUMMARY

The influence of the temporomandibular joint in mandibular movement and its relation to the occlusal surfaces of the teeth is extremely important. Conflict between the positions prescribed by the temporomandibular joint and those prescribed by the teeth must be recognized and the conflict resolved to assure a healthy functioning mouth.

Scientific Knowledge • An average mind can acquire a fair knowledge of the whole field of science, and find plenty of time to spare for ordinary human affairs. Not many people take the trouble to do so. But without a knowledge of science one cannot understand current events. That is why our modern literature and art are mostly so unreal. *John B. S. Haldane.*

Bonding of a synthetic resin material to human dentin: preliminary histological study of the bond area

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In a recent report[1] one of the authors described an adhesive resin composition capable of bonding to flat "wet" dentin surfaces of extracted human teeth. The liquid composition consists of 80 per cent methyl methacrylate monomer, 10 per cent methacrylic acid and 10 per cent glycerophosphoric acid dimethacrylate. The liquid is catalyzed by the addition of paratoluene sulfinic acid which causes polymerization thickening. Just prior to its gel stage, part of the mix is applied to the dentin surface and allowed to harden.

In this earlier study tests of the bond strength on a minimum of ten samples after one hour gave average tensile forces of 398 ± 99.4 pounds per square inch. After three months' water immersion, the bond strengths were approximately 213 ± 56 pounds per square inch. It was also observed that by treating the dentin surfaces with a drop of 7 per cent hydrochloric acid before applying the adhesive composition, the initial bond strengths and those found after water immersion were 100 per cent greater than on untreated surfaces. Under similar test conditions, conventional acrylic resin filling materials gave no measurable adhesion. It is felt that these findings represent significant progress toward the development of a practical adhesive restorative material.

Since the realization of the goal of an adhesive filling material will depend on a knowledge of the factors involved in bonding to dental tissues, it was necessary to decide (1) whether the observed bonding was due to mechanical retention, related to a unique ability of the adhesive composition to penetrate the dentin, (2) whether the bonding was due to chemical combination of the adhesive material with the components of the dentin and (3) if such chemical combination was with the organic or inorganic material of the dentin.

The idea that penetration of the adhesive material may be the basis for adhesion is suggested by the increased adhesion obtained on acid-treated surfaces, which would be more porous than untreated ones. However, since etching also exposes more organic matter for possible reaction with the adhesive composition, there is also reason to suspect that chemical reaction with the organic structures may be important. In original work by Kramer and McLean an altered stain-

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1. Buonocore, M. G.; Wileman, William, and Brudevold, Finn. Composition capable of bonding to human dentin surfaces. J. D. Res. 35:846 Dec. 1956.

ing of dentin was noted[2] histologically after the use of the Sevriton Cavity Seal whose active ingredient, considered to be glycerophosphoric acid dimethacrylate, is the same material used in our experiments. Kramer and McLean suggested that the altered zone was the result of a reaction between dentin and the active ingredient. A similar reaction might be responsible for or associated with our observed adhesion. It was felt that a histological study of the area of the bond might throw some light on the nature of the bonding phenomenon and perhaps provide answers to the previously mentioned questions. This paper reports the results of such a study.

METHODS

Specimens for sectioning were prepared in the following manner. Whole teeth which had been stored in a 4 per cent formaldehyde solution were ground under water on a carborundum wheel of Grit no. 38A60-18 VBE and polished on a silicon carbide wheel of Grit no. 37C 80-MV to expose smooth, flat, axial surfaces of dentin. Thereafter, they were stored in water until needed. Prior to use, the dentin surfaces were wiped with absorbent cotton and further dried with compressed air for one minute.

The dentin specimens were divided into three groups, each group being further divided into subgroups A for the controls and B for experimental specimens. In Group 1,A, a small amount (approximately 5 mm. diameter and 1 to 2 mm. thick) of a conventional acrylic resin filling composition was applied to each surface. To the surfaces of the experimental specimens (Group 1,B) a similar amount of the adhesive composition was applied.

In Group 2,A, a 7 to 10 mm. square area of each dentin surface was first treated with a drop of 7 per cent hydrochloric acid for one minute followed by washing and compressed air drying. A small amount of a conventional acrylic resin filling material was applied to Group 2,A, surfaces, whereas a small amount of the adhesive composition was placed on those of Group 2,B.

To determine if bonding could be obtained in the absence of inorganic matter, all dentin slabs in Group 3 were completely decalcified in 7 per cent hydrochloric acid prior to the application of a conventional resin composition (Group 3,A) and the adhesive composition, Group 3,B. All specimens were then trimmed leaving only a small block of dentin, covered on one surface with either the adhesive or the conventional acrylic filling material and stored in water for one month. The blocks were then decalcified in 5 per cent formic acid neutralized in a saturated solution of lithium carbonate and washed in running water for 12 hours. They were then dehydrated, cleared in dioxane and embedded in paraffin *in vacuo*. Sections 6 to 12 microns thick were cut at right angles to the flat dentin surface on a rotating microtome. Sections were stained by means of Jones's[3] toluidine blue method, hematoxylin and eosin and methylene blue. The methylene blue was used regressively, that is, the sections were overstained and decolorized in weak acid.

It was noted during the decalcification that the conventional acrylic resin materials in all groups dropped away from the dentin surfaces. These dentin blocks were nevertheless carried through the histological procedure in order to study any changes which might have occurred on the underlying dentin surfaces. The adhesive composition in all groups remained bonded to the dentin blocks throughout the histological processing.

2. Kramer, I. R. H., and McLean, J. W. Alterations in the staining reactions of dentine resulting from a constituent of a new self-polymerising resin. Brit. D. J. 93:150 Sept. 16, 1952.

3. McClung, C. E., editor. Jones's Handbook of microscopical technique for workers in animal and plant tissues, ed. 3. New York, Paul B. Hoeber, Inc., 1950.

RESULTS

Controls • Groups 1,A, 2,A, and 3,A, represented conventional acrylic filling materials placed on untreated, acid treated and completely decalcified dentin surfaces respectively. Except for a few sections in Group 1,A, showing a small piece of attached acrylic material (Fig. 1), no acrylic resin remained attached to the dentin in any of these sections nor were there any altered staining characteristics evident in the dentin. The photomicrograph in Figure 1 is from a hematoxylin and eosin stained section of Group 1,A, and is representative of the other A groups.

Fig. 1 • Hematoxylin and eosin-stained section from Group 1.A. Ordinary acrylic resin on untreated dentin. Small piece of acrylic resin remains attached to dentin. No zone of altered staining present

Experimental • The groups 1,B, 2,B, and 3,B, represented the adhesive resin placed on untreated, treated and completely decalcified dentin respectively. In all sections in these groups a thin layer of adhesive material remained bonded to the dentin. An altered staining zone was present in the dentin directly under the layer of attached adhesive material. The width of this altered zone ranged from 3 to 10 microns in Group 1,B, 10 to 20 microns in Group 2,B, to 20 to 30 microns in Group 3,B. Tubules in the altered zones generally appeared to be wider than normal and stained darker than those in the remaining dentin. With the exception of one stain (hematoxylin and eosin in Group 3,B), the altered zones stained darker than either the remaining dentin or the adhesive material. However, in Group 3,B, with hematoxylin and eosin staining, the altered zone appeared lighter than the rest of the dentin. In these sections the adhesive material itself appeared highly refractile and was barely stained, which if it is assumed that the adhesive material had penetrated the dentin in this area, might account for the lighter zone in the dentin. With toluidine blue the altered zones stained orthochromatically, whereas the rest of the dentin stained metachromatically. When the methylene blue stained sections were decolorized in weak acid, only the altered zone and the adhesive retained the intense blue stain. The photomicrographs (Fig. 2-4) show a typical section from each experimental B group.

DISCUSSION

The finding of a zone of altered staining in dentin under the adhesive resin but not under the conventional acrylic resin seems to indicate that this zone is directly associated with the formation of water resistant bonds with dentin. It is important, therefore, to consider the nature

Fig. 2 • Toluidine blue-stained section from Group 1,B. Adhesive material on untreated dentin. Altered zone 3 to 10 microns thick

Fig. 3 • Toluidine blue-stained section from Group 2.B. Adhesive material on acid-treated dentin. Altered zone 10 to 20 microns thick (high magnification)

Fig. 4 • Toluidine blue-stained section from Group 3.B. Adhesive material on completely decalcified dentin. Zone of altered staining 20 to 30 microns thick

and causation of this altered zone. Three possibilities which will be considered are:

1. Penetration of the adhesive composition or its components into the dentin.

It is possible that the adhesive resin, applied as a semifluid mass, may penetrate the dentin before it fully hardens. That this occurred is suggested by the greater penetration found on surfaces rendered more porous by prior decalcification by acid. The fact that the adhesive composition is in itself acidic may account for the observed small penetration on untreated dentin surfaces. The similarity in staining characteristics of the adhesive and altered zone further supports the idea of adhesive penetration.

2. Chemical reaction between the adhesive or one of its constituents with the dentin.

The possibility that the inorganic matter is involved in the zone-forming reaction can be discounted since the altered zone is also present in those sections which were decalcified prior to the application of the adhesive mix. However, since the adhesive composition contains a polymerizable primary phosphate ester and methacrylic acid, a secondary phosphate and a carboxyl group are available for reaction with basic groups of the organic constituents of dentin. The possibility of such a reaction must be considered as contributing to the observed bonding.

3. Solution and subsequent leaching of part of the adhesive or its constituents into the subjacent dentin during histological preparation.

Conceivably, the solutions used in the histological preparation may extract substances from the adhesive material, allowing them to concentrate in and perhaps combine with the dentin at the bond interface to alter its staining properties. It was felt that perhaps one of the reasons for the absence of an altered staining zone with the conventional acrylic resins might be due to their separation from the dentin in the initial steps of the histological preparation. That this was not the case was indicated by the observation that no zoning occurred in sections in which conventional acrylic resins were locked in place on the dentin surface by specially prepared undercuts which held the material in contact with the dentin during the histological processing.

Finally, it may be mentioned that although the cause of the altered zone has not been fully established by this research, the fact that a direct relationship exists between the strength of the bond

and the thickness of the altered zone suggests that the ingredient or combination of ingredients causing the zone also promotes adhesion. Experiments are now in progress to test individually the ingredients of the adhesive composition for their ability to form an altered zone in the hope that a knowledge of the chemical structure of the active substances not only will help in understanding the chemical reactions involved in bonding but also assist in the synthesis of homologues and related structures which may promote better adhesion.

The authors wish to emphasize the experimental nature of these studies designed solely for the purpose of obtaining basic information relating to the adhesion of resin materials to tooth structure. Because of their experimental nature, methods and materials outlined in this report are not presently recommended for clinical practice.

SUMMARY AND CONCLUSIONS

A histological study of the bond area between an adhesive resin and dentin revealed a zone of altered staining characteristics 3 to 10 microns wide in the dentin.

Application of the adhesive material to acid etched and completely decalcified dentin surfaces showed greater bond strength associated with increased width of the altered zone to 10 to 20 microns and 20 to 30 microns, respectively.

It is suggested that bond formation may be due either to physical penetration of the adhesive material into the dentin or to chemical combination of the adhesive composition with dentinal organic matter or to both.

Because the methods and materials used in the study are purely experimental, their use in clinical practice is not now recommended.

What Scientists Know and Do Not Know About the Atom • No one doing research today on the new atomic and subatomic particles in physics can have the slightest doubt that what we know about atomic nuclei is but a tiny speck compared to our ignorance. *Glenn T. Seaborg, acceptance speech, Nobel Prize in Chemistry.*

Oral calcium penicillin V in dental practice: a preliminary study

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Danish dentists became entitled to prescribe penicillin in 1955. Ever since, they have displayed interest in the development of new penicillin preparations. A new Danish penicillin preparation for oral use was issued about two and a half years ago. Since the use of oral penicillin has been found to be of value in dentistry, this preparation, calcium penicillin V in the form of tablets, was tested during the past year and a half at the dental clinic of the University Hospital, Copenhagen.

PROPERTIES OF PENICILLIN V

As early as 1948 a large number of penicillins, including phenoxymethyl penicillin (later called penicillin V), were produced in the United States, but it was not until 1953 that Austrian workers discovered that penicillin V possessed certain properties which made it especially suitable for oral use. Whereas the penicillins used so far (benzyl penicillin or penicillin G) are rapidly destroyed in an acid medium, penicillin V is about five times more stable in such a medium.

Numerous studies have been published on penicillin V, its pharmacological properties and its antibacterial activity. In most of the pharmacological investigations it has been compared with penicillin G when administered by the oral as well as the parenteral route. After oral administration penicillin V was found to be absorbed better than penicillin G, and it also gave higher serum levels.[1] Comparing penicillin V administered by mouth with injected penicillin G, Henry and co-workers[2] found that with penicillin G the serum levels were higher during the first hour, whereas two to four hours after administration, penicillin V gave higher levels.

In regard to antibacterial activity, penicillin V is fully as effective as penicillin G. Like other penicillins, it is of low toxicity, and most authors appear to be agreed that allergic reactions are less common with oral penicillin V than with injected penicillin G.

In Denmark Henriksen and others[3] in 1956 made a report on a calcium salt of phenoxymethyl penicillin, which is slightly soluble in neutral solutions. Since penicillin V and its salts are chemically well-defined substances, the amount of peni-

The oral calcium penicillin V used in this study was kindly supplied by Leo Pharmaceutical Products, Copenhagen, under the name Calcipen Leo.

From the dental clinic, University Hospital.

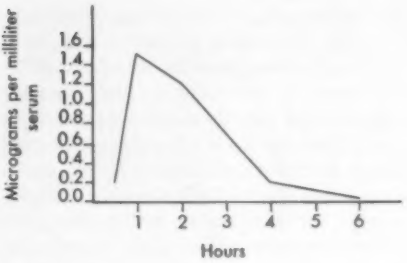
At present, Royal Dental College.

1. Wright, W. W., and others. Serum concentrations and urinary excretion following oral administration of penicillin V and comparison with penicillin G. Antibiotic Med. 1:490 Sept. 1955.

2. Henry, L.; White, G., and Maynell, M. J. Oral administration of penicillin. Brit. Med. J. 5009:17 Jan. 5, 1957.

3. Henriksen, E., and others. Et nyt, peroralt virksomt penicillinpraeparat (Calcipen Leo). Ugeskr. laeger 118:801 July 12, 1956.

cillin is stated in units of weight. It may be said that 1 mg. of calcium phenoxymethyl penicillinate is approximately equal to 1,500 units. Since the studies to be reported were carried out with calcium penicillin V, a curve representing the serum levels obtained after oral administration of 200 mg. calcium phenoxymethyl penicillinate is given in the illustration. This shows that at the end of six hours there was a therapeutic quantity in the serum.



Concentrations in serum of penicillin after oral administration (in connection with a meal) of 200 mg. calcium phenoxymethyl penicillinate. Values represent average from 10 persons. One microgram is equal to about 1.5 units

PREVIOUS LITERATURE ON PENICILLIN V IN DENTISTRY

So far, only two reports have dealt with the use of penicillin V in dental practice. In Germany, Herrmann[4] treated 52 patients with tablets which contained 60 mg. phenoxymethyl penicillin acid, stated to correspond to 100,000 units. His 52 cases comprised instances of pericoronitis of the lower third molars, abscesses, osteitis, sinusitis and stomatitis. Two patients had the tablets after removal of dental foci of infection. All patients had 6 tablets in the 24 hours. In the majority, a satisfactory therapeutic result was observed after administration of 10 tablets. Twelve patients had 10 more tablets and four required a total of 30 tablets. In Herrmann's experience, penicillin therapy in instances of small abscesses obviated the necessity of incision. No allergic reactions were observed, and only one patient had slight diarrhea.

In Italy Venelli[5] made a preliminary report on 20 patients with various oral infections treated with oral penicillin V. He found the penicillin an effective, safe and reliable therapeutic agent for the majority of penicillin-treatable infections to be found in dental practice.

INVESTIGATION

Patients for whom penicillin therapy is indicated have been treated with calcium penicillin V at the dental clinic of the University Hospital, Copenhagen, for the past year and a half. The tablet preparation used contained 200 mg. calcium phenoxymethyl penicillinate, corresponding to 300,000 units. The usual dosage was 1 tablet three times daily, taken at mealtimes. Children were given ½ tablet three times daily. In this analysis of the material, patients who had previously received penicillin G or who did not complete the treatment are not considered. This leaves 139 patients.

When penicillin is found to be indicated at the dental clinic of the University Hospital, the patient's record is furnished with the following information:

1. Allergy to penicillin.
2. If positive, when.
3. Other allergic reactions.
4. Penicillin preparation.
5. Symptoms and signs.
6. Date of questionnaire.

Penicillin for Prevention • In dentistry, penicillin may be used as a preventive or as a curative measure. In this study it was used for prevention in 64 patients,

4. Herrmann, H. Perorale penicillinanwendung. Deut. Zahnärztebl. 9:360 May 22, 1955.

5. Venelli, G. P. La penicillina V (fenosi-metil-penicillina) nella pratica stomatologica ambulatoriale. Minerva stomat. 5:221 July-Aug. 1956.

the largest group of which had extractions for acute conditions. In such instances, in which there is generally an acute alveolar abscess in the endosteal stage, extraction usually can be carried out without complications. Such patients had 1 tablet one half to one hour before the extraction and thereafter 1 tablet three times daily, usually for two days. As in the other conditions treated with penicillin, the clinical course decided the length of time that penicillin medication was continued. In the 26 patients in this group, the average dose was 6 tablets. The course after extraction was uneventful in all instances, and the acute inflammation subsided within one to three days.

The next subgroup within the group of patients receiving penicillin for preventive use comprised patients undergoing oral surgical procedures for conditions in the subacute stage, that is, major infected cysts and overlooked roots with infected surroundings. These patients also had 1 tablet before the operation and thereafter 1 tablet three times daily. The average consumption was 7 tablets in the 21 patients of this group. No complications occurred except in one instance. As a part of the treatment of pericoronitis, a patient was to have eight teeth extracted. For ten days before the operation the patient received 1 tablet three times daily, and the condition cleared fairly well. After the extraction, there was a recurrence of constriction and swelling, so penicillin therapy had to be prolonged for eight days.

In these two groups of patients receiving penicillin for prevention, the penicillin was given in order to prevent deleterious spread of the bacteremia caused by the surgical intervention. An absolute indication for preventive penicillin therapy is extraction of teeth in patients with subacute bacterial endocarditis, but no such cases are included in the present series.

In the following groups the preventive penicillin therapy was designed mainly to prevent the occurrence of local infections.

The group of patients with perforations to the maxillary antrum comprised one patient with displacement of a root into the antrum and seven patients with perforation to the antrum during oral surgery. Since there is generally a question of an infected environment, penicillin ought to be administered to prevent the development of sinusitis. The patients in this group usually had 1 tablet three times daily. The administration of penicillin was continued for one to three days, in one instance for 11 days. The average consumption was 10 tablets. No signs of sinusitis were observed.

Six patients with mandibular fractures had penicillin for prevention. In four a tooth was in the fracture line, and in the other two, defects occurred in the gingival mucosa and the fragments were displaced. In such jaw fractures, where there is a considerable risk of infection, the preventive use of penicillin is absolutely indicated. Often, 1 tablet three times daily for five to six days will be sufficient, and after that time the fracture generally has been reduced and immobilized. If the treatment necessitates the extraction of a semiembedded lower third molar in the fracture line, penicillin medication should be continued and the dose possibly increased, until the condition has cleared. In the six patients in this group, the average dose was 17 tablets.

Preventive penicillin medication was used for three patients, either in replantation of teeth or after repositioning of teeth with severe luxation. Frequently, these conditions are combined with damage to the lips, and in the case of total luxations (exarticulations) the teeth may have been in an infected environment. In such instances the patients were treated by 1 tablet three times daily for three days. In instances of mild luxation or total luxation in which the tooth is not out of the mouth, penicillin is generally not necessary.

Penicillin in Treatment • The curative use of penicillin in dental practice is mainly in abscesses. It must be realized, however, that a far advanced abscess should be incised and emptied of pus rather than treated with penicillin. Penicillin may arrest incipient formation of pus and thus delay the process. In the great majority of instances, incision and application of a small gauze pack or drain is sufficient. Only if it is believed that a developing abscess can be arrested or if the general health is affected should penicillin be used; in instances of acute alveolar abscess, this means in the subperiosteal and endosteal stages.

The dosage was 1 tablet three times daily for a period determined by the clinical course. In 21 instances of acute alveolar abscess the average dose was 8 tablets.

Abscesses of a different etiology also have been treated by penicillin. Most of the abscesses followed extractions. As in acute alveolar abscesses, the penicillin therapy had a surprisingly rapid effect. The aim of the treatment is rapid elimination of the acute symptoms, so that the cause, in most instances an overlooked root or a sequestrum, can be removed. In the 17 patients in this group, the average dose was 12 tablets.

Pericoronitis of the lower third molars often has such a stormy course that penicillin therapy is indicated. The pronounced restriction makes it difficult to inspect and to extract the tooth concerned. The almost invariable swelling may reach great dimensions, and the general health of the patient frequently is affected as well. If this disease is treated at a relatively early stage by the administration of penicillin (1 tablet three times daily), in one to three days the constriction and swelling may subside so much that the tooth can be removed. Penicillin should be continued, however, for a day or two after the operation, as it usually has been carried out in a highly infected environment. The 27 patients with this condition had an average of 18 tablets.

Cervicofacial actinomycosis has been treated almost exclusively by penicillin G for the past ten years. Since this disease requires large doses of penicillin over a long period, it seemed interesting to compare the effect of penicillin G with that of calcium penicillin V. Four patients with bacteriologically confirmed actinomycosis originating from the lower teeth, therefore, were treated by 3 tablets three times daily. In one instance it proved necessary to increase the dose to 4 tablets three times daily. In all instances the actinomycotic infection yielded to the penicillin therapy within three to four weeks, and followup at the end of 12 to 15 months showed no signs of recurrence. The number of tablets given ranged from 195 to 327. A detailed report of these cases will be published elsewhere.

Three patients in the present series had subacute osteoperiosteitis. In these patients the condition was of fairly long standing, manifesting itself clinically as severe, firm swelling and pain. The clinical picture is similar to actinomycosis, but bacteriological culture has failed to show actinomyces. Treatment was by 3 tablets three times daily for 3 to 12 days. The average consumption was 51 tablets. The infection yielded in all instances.

The last indication for oral penicillin therapy to be mentioned here is Vincent's infection, which in certain instances can develop into stomatitis. It must be emphasized that in such instances penicillin was used only if the general health was affected and in the presence of constriction as well as regional lymphadenitis. In the great majority of instances a good result is obtained quickly by effective local therapy. This local therapy, however, must not comprise the local use of penicillin in the form of lozenges and the like, as it is important to avoid any risk of penicillin sensitization. The three patients with Vincent's infection in this series, who constituted only 8 per cent of

all patients with Vincent's infection treated in the dental clinic, received only 3 tablets in the course of one day. The systemic symptoms and the constriction subsided so much that only local treatment was necessary thereafter to bring about a cure.

DISCUSSION

On the basis of the results obtained by the use of calcium penicillin V at the dental clinic of the University Hospital, Copenhagen, oral treatment with penicillin V has given the same good results as injections of penicillin G. Assessed from the clinical point of view, the result was satisfactory in all patients treated.

Although oral penicillin appears less apt to give rise to allergic reactions than injected penicillin, the patients always must be asked whether they previously have had penicillin and whether such treatment has caused allergic reactions. If so, penicillin therapy, if instituted at all, must only be carried out in close collaboration with the patient's physician. The occurrence of black tongue need not contraindicate the continuation of penicillin therapy. In the present series, only one patient, a 39 year old woman, exhibited mild allergic reaction in the form of small vesicles on the tongue, after which penicillin was discontinued.

The use of penicillin V in dental practice is of great value to the dentist, but at the same time it increases his responsibility, as the possibilities of abusing the use of this valuable antibiotic have been increased by the use of the oral route of administration. It cannot be repeated too often that penicillin should not be given except when strictly necessary. This paper gives a survey of some dental and oral diseases which can be treated successfully by penicillin, but it must be emphasized that in many instances of these same diseases only local therapy is needed.

SUMMARY

The use of oral penicillin V appears to involve less risk of allergic reactions than the use of injected penicillin G.

The results obtained with penicillin V in the dental clinic of the University Hospital, Copenhagen, during 1956 and 1957 are reported. The product used was Calcipen Leo tablets, each tablet containing 200 mg. calcium phenoxymethyl penicillinate which corresponds to 300,000 units. Normally, the dosage was 1 tablet three times daily for three days.

One hundred and thirty-nine patients were divided into groups in which calcium penicillin V was used for prevention and into others in which it was used for a cure. An excellent response in four instances of bacteriologically confirmed actinomycosis is worthy of special attention. In these particular instances the dosage was 3 to 4 tablets three times daily for three to five weeks. In the other conditions treated, calcium penicillin V was also as effective as penicillin G which so far has been more commonly used in dental practice.

The introduction of calcium penicillin V in dental practice is a great advantage. At the same time, however, its use increases the risk of abuse and consequently increases the responsibility of the dental profession.

4 Universitetsparken

Object of Science • The work of science is to substitute facts for appearances, and demonstrations for impressions. ***John Ruskin.***

Dental services in a major disaster

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That the possibility of an enemy attack by modern thermonuclear weapons presents a serious menace to this country, threatening its very existence, has been known for some time. More recently, however, realization of the nature and extent of such attack has enlarged the scope of defense planning. In the event of an all-out attack, the reality of nationwide damage and the displacement of large masses of population, perhaps over a long period, must be faced, rather than isolated and circumscribed areas of destruction with which the surrounding communities may cope. This has changed the logistics of all postdisaster planning, including the role that dentists must assume in it.

On the assumption that 20 MT ground burst weapons will be used, in a radius of five miles around each bomb impact complete destruction of buildings and people who are not protected must be anticipated. From 10 to 15 miles farther away there will be serious damage to buildings and many casualties. This is the thermal and blast effect. In addition, in these areas and spreading downwind, there may be extensive coverage by radioactive fallout which would kill or seriously incapacitate large masses of people and domestic animals.

If any large numbers of such bombs are distributed throughout the country, the devastation and disruption of the normal way of life will be catastrophic. Millions of people will be killed, millions will be seriously injured, and large parts of the nation's industries razed. Because of widespread radioactive fallout covering whole sections of the country, thousands of people will be displaced to areas less seriously contaminated. Communications and public utilities will be disrupted and the nation will be in a state of severe shock.

Disaster plans which have been developed in many sections of the United States will then begin to operate. Surviving state and local governments will direct saving of lives, restoring of order, and salvaging of public utilities and industrial plants. The protective disaster planning of federal, state and local governments will yield large dividends in directing the course of emergency activities.

A high priority in postdisaster services planning is the saving of human lives. Those who are not injured will help those who are. First aid and emergency medical care will be given in areas not too seriously contaminated by fallout. Radiological monitoring will determine where personnel can operate, and stretcher bearers and first-aid teams on the periphery of blast areas will transport casualties to emergency treatment stations and to emergency and existing

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hospitals in uncontaminated areas. Many who have minor injuries will walk to the treatment centers.

Dentists not incapacitated by the blast will work with physicians in the early postattack days. They, with other allied health personnel, will assist in caring for the injured people. They will work on a 24 hour basis in temporary and emergency hospitals to give first aid and to treat the less seriously injured. The latter should have a high priority to enable them to engage in rescue services and productivity. In these services dentists will be especially valuable if they have had first-aid and casualty care training and it is for these services that dentists in all parts of this country are presently training.

Presumably at the end of the third or fourth week after the attack, some semblance of order will be effected and all less seriously injured people will have been cared for. By that time the emergency hospitals will be converted to more permanent installations, and the seriously injured will receive definitive treatment. With the exception of the oral surgeons, who will care for jaw and facial injuries, and dental anesthetists, who will be needed in the operating rooms, most dentists will be released for other duties.

In any such widespread disaster involving large areas of this country there will be serious disturbances of the normal way of life. The following may be anticipated:

1. Large masses of population will be homeless, either because of destruction of their houses or because of heavy radiation hazards rendering the dwellings uninhabitable. These people will be moved to temporary quarters under the austerity of emergency and survival conditions.

2. Communications, the flow of traffic, and public utilities will be greatly disrupted.

3. Many industries and factories, centers of essential productivity, also will be disrupted.

4. Large areas of farm lands may be made unsafe for cultivation and America's agricultural resources will be greatly depleted for some time.

These and other disaster conditions may prevail immediately after the attack. How long they will continue will depend on the extent and severity of the damage and the nation's capabilities of rehabilitation and reconstruction.

In view of the possible postattack situation, one of the most important considerations is the health and welfare of the noncasualties, many of whom will have been displaced and living under unfavorable conditions. These are the people who must repair the damage and reconstruct the industries. To restore the American way of life will involve stupendous problems of housing, feeding and welfare.

In the mass movement of populations, medical care is most important. These people will be subject to the usual sickness and injuries of everyday life and also will be exposed to epidemics that commonly occur when large numbers of people are displaced. Babies will continue to be born, appendixes will require removal, the accident rate will be high and all forms of infectious diseases will be prevalent. Such commonplace events will place a tremendous load on the medical and public health resources of the remaining population.

If these postdisaster conditions continue over a long period, people will develop oral and dental diseases which will require treatment. Teeth will continue to decay, there will be toothaches and periodontal infections that will compel attention. The replacement of dentures will be an important health problem. All this definitely brings dentistry into the disaster planning program.

Just as medicine now is studying intensively the forms of emergency medical care to be employed in a disaster pro-

gram, so also should dentistry give careful consideration to the types of dental service suitable for masses of displaced people.

In the first place, in a major enemy attack all dental offices in a target city and for some distance about will be demolished or rendered untenable because of radiation hazards. Emergency dental services then must be performed in relocation areas in any available building, perhaps under conditions of extreme austerity. Some equipment and supplies may be salvaged from damaged dental offices, and it is possible that some dental supply depots may be found from which dental equipment can be obtained. It may well be that the leading dental manufacturers, most of whom are located in principal cities, will be out of commission. This will make the availability of equipment and supplies for dental services very limited. At the worst, teeth can be extracted from patients sitting in a kitchen chair. Dentures may be processed with meager equipment in any building having running water and heat. If circumstances should require, some dentistry can be done with very simple equipment. In view of the situation that may exist, the question arises as to what are the priorities of emergency dental services for masses of displaced people, and how may they best be performed under conditions of extreme austerity.

Obviously the first priority for dentistry will be relief of pain and the extraction of teeth. Extraction is a positive and definitive treatment for most toothaches and periodontal infection. It may be performed in the field or in any temporary quarters. All that is required is a basic set of dental forceps. Local anesthetics are highly desirable, but are not indispensable. Extraction of teeth, if not contraindicated by previous radiation, will meet the immediate needs for dental attention in a large percentage of instances.

The second priority should be the replacement of teeth when so many have been lost that function is impaired. People can survive indefinitely without teeth, but seriously crippled dentures or the loss of all teeth may give rise to unfavorable psychological reactions, and digestive and nutritional disturbances. The replacement of teeth under such conditions may effect a significant improvement in the well being and productive capability of people. Denture service is therefore an important function in any disaster program. Dentistry should study the methods by which such service may be performed under conditions of privation and almost primitive simplicity. This will include determination of the most practicable methods of denture prosthesis in the field and in temporary and emergency quarters, the simplified equipment that will be required, and the necessary materials and supplies.

The third priority will be filling of teeth and prophylactic measures for the control of dental caries and periodontal disease. These can be undertaken only after the general postattack situation has been adjusted and some semblance of order has been established. Some quarters may be found where temporary dental offices may be set up, either in hospitals or in usable buildings. The available equipment may be meager, largely gathered from damaged office buildings.

If dental engines and burs are not available, excavation of cavities must be done by hand excavators and chisels, reminiscent of the early days of dentistry. Filling materials will be limited to those that are available. Only those operations that can be performed in a relatively short time should be undertaken. No endodontia or extensive periodontal treatments will be attempted. Operative dentistry will be limited to temporary fillings and superficial scaling of calculus to relieve inflammation. The objective will be the greatest possible good for the greatest number.

In any such major catastrophe public

health will be a most important consideration. When people are displaced there are always problems of water supply and its safety, mass feeding, sanitation, and the control of epidemics. In this field dentists can play a valuable role. Many of them will have no offices in which to work and relatively few will be required for dental services in an emergency program. As part of a welfare or public health team they would be available for, and could contribute valuable assistance to, the care of refugees. Some dentists have had public health training either in active service or in the reserve corps. Others, with a little information in an emergency, could adapt their capabilities to health services.

After a thermonuclear weapon attack one of the most important considerations for the survivors will be the degree of radiation hazard. There will be great need for skilled monitors in every locality to determine its safety and its dangers. Dentists with some training might well qualify in this field. Most of them are familiar with x-ray machines. They already know something of the principles and hazards of radiation. They do require, however, specialized training in radiation monitoring and the medical aspects of radiation.

Such training is now being made available in every area through the state and local civil defense offices. This is a definite function of dentistry in civil defense, in addition to emergency medical services. State and local civil defense committees should consider the possibilities of arranging for such instruction for the benefit of their membership.

As yet no stockpile of dental instruments and materials has been made by the federal agencies, other than a small oral surgical kit which is included in the OCDM Emergency Hospital. The storage of dental equipment to be used in an emergency has not been requested by the American Dental Association.

There is reason to believe that in any dislocation area there will be small towns in which there are dental offices. These presumably will be used for emergency dental services, or the supplies which they contain can be transferred readily to temporary offices in the encampment. It is also possible that in such areas there will be dental laboratories and supply houses in which much valuable dental equipment may be found.

In view of these possibilities, it is highly desirable that all dentists in small towns, remote from probable attack areas, shall keep their inventories of filling materials, anesthetics and other basic supplies high, in order that these may be available in an emergency.

Dentistry and dentists very definitely have an important role in national defense at the time of a catastrophe if and when it comes. Who can say it will not happen? The question is, will dentists be prepared to assume their full responsibilities if it does happen?

Education and Indoctrination • A good teacher should enjoy hearing the ideas of his students and should also enjoy telling his students his own, but has no plan making them think as he does. If the student thinks as the teacher does that may please the teacher; but if he does not, the honesty of the student's thought will please him just as much. That is just the difference between education and indoctrination. *Alan Paton. The Land and People of South Africa.*

Epidemiological trend patterns of dental caries prevalence data

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The need for uniform standards for measuring dental caries prevalence has received increasing attention during recent years. The American Dental Association held a conference, November 2-3, 1953, for the purpose of developing uniform standards and procedures in clinical studies of dental caries. A summary of the deliberations of the conference was published in a 67 page report.[1] A major concern of the Fourth Workshop on Dental Public Health, University of Michigan, April 2-6, 1956, was the collection and analysis of data on dental caries.[2] In June 1956, the European Association for Research on Fluoridation and Caries Prevention adopted standard methods of recording dental caries.[3] Two commissions of the International Dental Federation, the Scientific Commission and the Public Dental Health Services Commission, discussed progress in the "Standardization of Caries Recording Methods" at the meeting of the Twelfth International Dental Congress in Rome, September 1957.[4,5] Thus it is evident that this subject is of international as well as national concern.

There appears to be universal agreement that statistics on dental caries may serve three broad purposes: for epidemiological investigations on the characteristics of dental caries in population groups; for dental public health program planning and evaluation and for testing preventive and control procedures. It is also generally acknowledged that the prevalence of dental caries may be measured in terms of the percentage of persons affected, the number of teeth attacked, the number of tooth surfaces involved, the number of discrete cavities and the size or degree of severity of each carious lesion.

The importance of age at the time of exposure of the teeth to caries is implicit in the requirement that observations on dental caries prevalence be classified according to the age of the members of the population groups under study. Separation of the findings in deciduous teeth from findings in the permanent teeth also emphasizes the significance of age at the time of exposure to caries attack. However, a wide diversity of opinion exists as to measurement requirements for reliable data on dental caries incidence and prevalence. Detailed analyses of these differences have been presented in afore-mentioned reports and references and will not be repeated here. This article will be limited to a consideration of the trend

Assistant Surgeon General, Chief Dental Officer, Public Health Service, Department of Health, Education, and Welfare, Washington, D. C.

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2. The practice of dental public health; proceedings of the fourth workshop on dental public health. Ann Arbor, Mich., University of Michigan, 1956.

3. Baume, L. J. Zum Standard-Kariestest der ORCA. Zsch. prophylaktische Medizin. May 1957.

4. Davies, G. N. The epidemiology of dental caries. Internat. D. J. 8:169 June 1958.

5. Baume, L. J. Statistical appraisal of dental caries. Odont. Revy. 8:155, 1957.

Table 1 • Number of children, number of DMF permanent teeth and surfaces per child, and percentage with one or more DMF permanent teeth, by age, for specified groups of school children

Item	Age last birthday									
	6	7	8	9	10	11	12	13	14	15
Aurora, Illinois—1945-1946										
Number of children	502	538	509	393	427	413	426	403	433	468
Per cent with DMF teeth	14.9	34.6	45.6	56.0	67.2	72.9	73.2	73.2	78.3	83.1
DMF teeth per child	0.3	0.7	1.1	1.5	2.0	2.6	2.9	3.1	3.6	4.5
DMF surfaces per child	0.3	0.9	1.4	2.1	2.9	4.3	4.5	4.8	5.6	7.7
Chattanooga, Tennessee—1948-1949										
Number of children	17	439	510	519	528	511	591	580	541	274
Per cent with DMF teeth	88.2	73.1	85.3	88.8	91.1	94.1	95.6	95.9	96.9	98.9
DMF teeth per child	2.2	2.0	2.7	3.4	4.0	4.9	6.4	7.4	8.9	9.5
DMF surfaces per child	2.8	2.7	3.7	5.4	6.6	8.3	11.0	12.7	15.6	17.3
Cumberland, Maryland—1946										
Number of children	133	119	154	140	144	109	42	8	.....	.....
Per cent with DMF teeth	36.8	64.1	79.2	90.0	95.1	95.4	97.6	100.0	.....	.....
DMF teeth per child	0.7	1.6	2.2	3.3	4.2	5.4	6.1	9.5	.....	.....
DMF surfaces per child	1.1	2.3	3.7	6.6	8.5	11.2	13.1	22.5	.....	.....
Grand Rapids, Michigan—1944-1945										
Number of children	1789	1806	1647	1639	1626	1556	1685	1668	1690	1511
Per cent with DMF teeth	34.6	68.5	87.3	93.8	96.1	97.7	98.9	99.2	99.1	99.3
DMF teeth per child	0.8	1.9	2.9	3.9	4.9	6.4	8.1	9.7	10.9	12.5
DMF surfaces per child	1.0	2.6	4.7	6.9	9.4	12.5	15.4	18.7	18.9	29.1
Grand Rapids, Michigan—1954-1955 (Continuous residents, after 10 years of fluoridation)										
Number of children	561	751	567	477	515	499	260	224	250	240
Per cent with DMF teeth	10.7	33.2	50.6	66.9	73.4	83.2	86.5	89.3	94.4	98.8
DMF teeth per child	0.2	0.7	1.3	2.0	2.3	3.0	3.9	5.0	6.8	8.1
DMF surfaces per child	0.2	0.8	1.8	2.9	3.4	4.6	6.7	9.1	11.8	15.8
Hagerstown, Maryland—1937-1939										
Number of children	327	403	487	493	529	531	596	565	695	651
Per cent with DMF teeth	15.9	36.2	53.4	70.6	78.3	81.9	87.8	90.8	95.3	96.5
DMF teeth per child	0.3	0.7	1.2	2.0	2.5	2.8	3.7	4.6	5.6	6.6
DMF surfaces per child	0.4	1.0	1.7	3.8	4.9	5.2	7.1	9.2	11.0	13.4
Miami County, Ohio—1946										
Number of children	....	461	592	525	521	539	498	432	359	153
Per cent with DMF teeth	....	67.9	79.4	88.6	92.1	95.9	95.4	97.2	94.7	96.1
DMF teeth per child	....	1.8	2.5	3.1	3.9	4.9	6.1	7.0	7.9	8.3
DMF surfaces per child	....	2.3	3.5	4.7	6.3	8.5	10.5	12.4	13.7	14.9
Nicollet County, Minnesota—1942										
Number of children	268	252	276	282	276	265	289	231	159	142
Per cent with DMF teeth	23.5	53.6	75.7	84.0	86.2	89.2	92.7	95.2	94.3	98.6
DMF teeth per child	0.5	1.4	2.3	2.9	3.4	4.2	5.5	6.3	7.7	9.6
DMF surfaces per child	0.6	1.8	2.8	4.1	5.1	6.5	9.1	10.0	13.0	17.1
Richmond, Indiana—1946 (Round 1 after treatment)										
Number of children	528	507	440	495	422	358	359	371	369	372
Per cent with DMF teeth	48.5	79.5	84.1	92.5	93.4	96.1	96.7	97.0	98.1	97.8
DMF teeth per child	1.3	2.5	2.9	3.8	4.9	6.1	8.3	8.9	10.4	10.3
DMF surfaces per child	1.8	3.9	4.8	6.5	8.6	10.7	15.2	16.7	20.1	20.0
Woonsocket, Rhode Island—1945 (Round 1 after treatment)										
Number of children	696	669	594	624	573	580	544	467	439	265
Per cent with DMF teeth	55.2	85.9	95.1	97.3	98.3	98.8	99.6	100.0	99.8	100.0
DMF teeth per child	1.5	2.9	3.8	4.6	5.9	7.6	10.4	12.0	14.1	15.0
DMF surfaces per child	2.5	5.0	7.6	9.2	12.5	15.8	21.2	24.3	29.6	33.1

patterns and correlations of the first three measures of caries prevalence: the percentage of persons affected, the average number of teeth attacked and the average number of tooth surfaces involved.

MATERIAL AND METHOD

Data on the prevalence of dental caries in permanent teeth of school children, collected by the United States Public Health Service in ten dental surveys in nine different communities, were selected for the purposes of this analysis. The first of these surveys was begun in 1937 and the last was completed in 1955. The number of examiners in each of the surveys varied from one to five. Thus the data from the different surveys vary widely not only in time and place, but they contain the variability inherent among different examiners as well as that within the same examiner at different time periods.

Details of the methods used in collecting and processing the data have been presented in previous publications.[6-8] In general, the examinations were made with mouth mirror and explorer under fairly uniform lighting conditions. Compressed air was available as an aid to the examiners in most but not all of the surveys. Only that portion of the original data useful for the purposes of the present discussion is presented in Table 1.

ANALYSIS OF DATA

Several trend patterns for parts of these data have been demonstrated and discussed in previous publications. For example, the percentage of children with one or more DMF permanent teeth increases progressively with age, beginning at age six. The increase is orderly and takes the form of a catalytic curve with an upper asymptote of slightly under 100 per cent. The rate of increase toward saturation varies widely, however, among

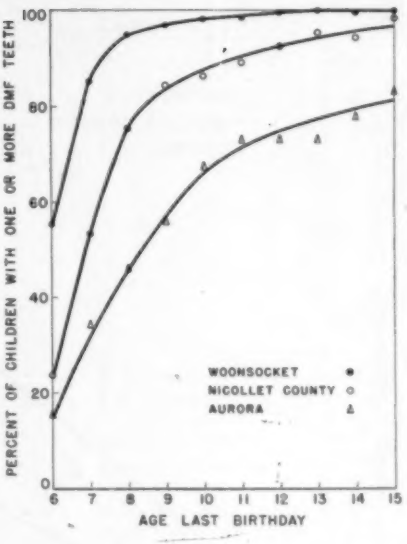

Fig. 1 • Relationship between prevalence of dental caries experience in permanent teeth of children, measured as the percentage of children with one or more DMF teeth, and chronological age

different groups of children and is clearly indicated by the data in Table 1 and Figure 1. The rate is lowest for children of Aurora, Illinois, where 1.2 ppm of fluoride occurs naturally in the drinking water, and highest for children of Woonsocket, Rhode Island.

Perhaps the most commonly noted pattern of dental caries prevalence is the fairly uniform increase, by age, in the average number of DMF permanent teeth per child. The rate of increase is sufficiently uniform to warrant description by a straight line and to justify

6. Klein, Henry, and Palmer, Carroll E. On the epidemiology of dental caries. University of Pennsylvania Bicentennial Conference. Philadelphia, University of Pennsylvania Press, 1941, p. 1-25.

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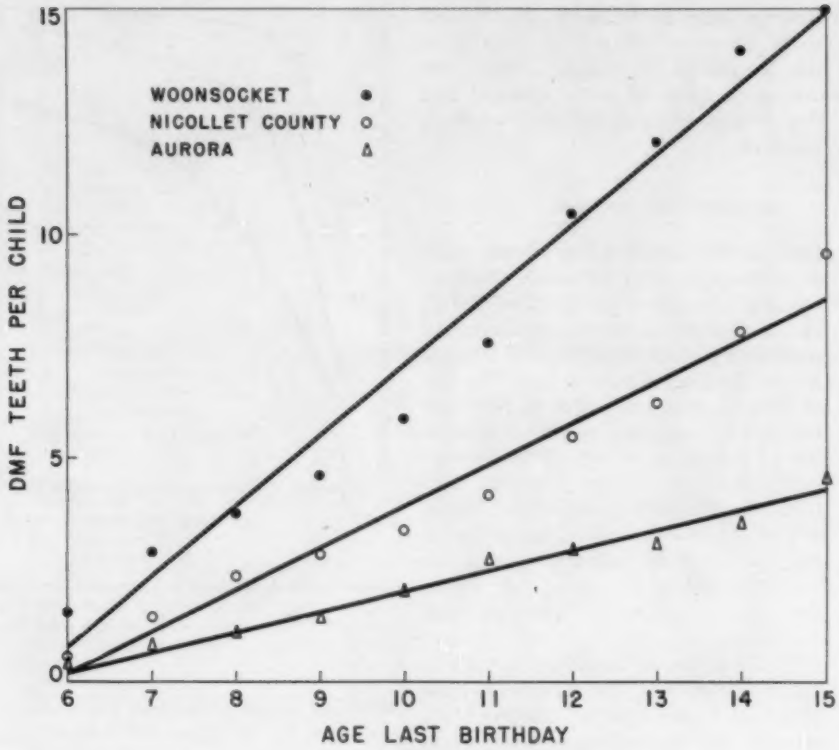

Fig. 2 • Relationship between prevalence of dental caries experience in permanent teeth of children, measured as the number of DMF teeth per child, and chronological age

interpolation and extrapolation from two or three observed points, such as for ages 7, 9 and 11, to obtain reliable approximations for each age from 6 through 15 years. This relationship is illustrated in Figure 2.

A direct relationship between the proportion of persons with dental caries and the number of teeth and tooth surfaces involved would appear to be a reasonable expectation. Nevertheless, the extent and nature of that correlation has not been of widespread interest among students of dental caries prevalence. The relationship between the percentage of children of a specific age with one or more carious permanent teeth (y) and the average number of DMF permanent teeth per child (x) of that age has been satisfactorily described by the equation $97 - y = 97\ (0.524)^x$. It has been demonstrated that useful estimates of the average number of DMF permanent teeth per child may be obtained by limiting the examination findings to a determination of the proportion of children by single years of age who have one or more DMF permanent teeth.[9] The relationship of the data for the ten surveys to the standard curve is shown in Figure 3.

9. Knutson, John W. An index of the prevalence of dental caries in school children. Pub. Health Rep. 59:253 Feb. 25, 1944.

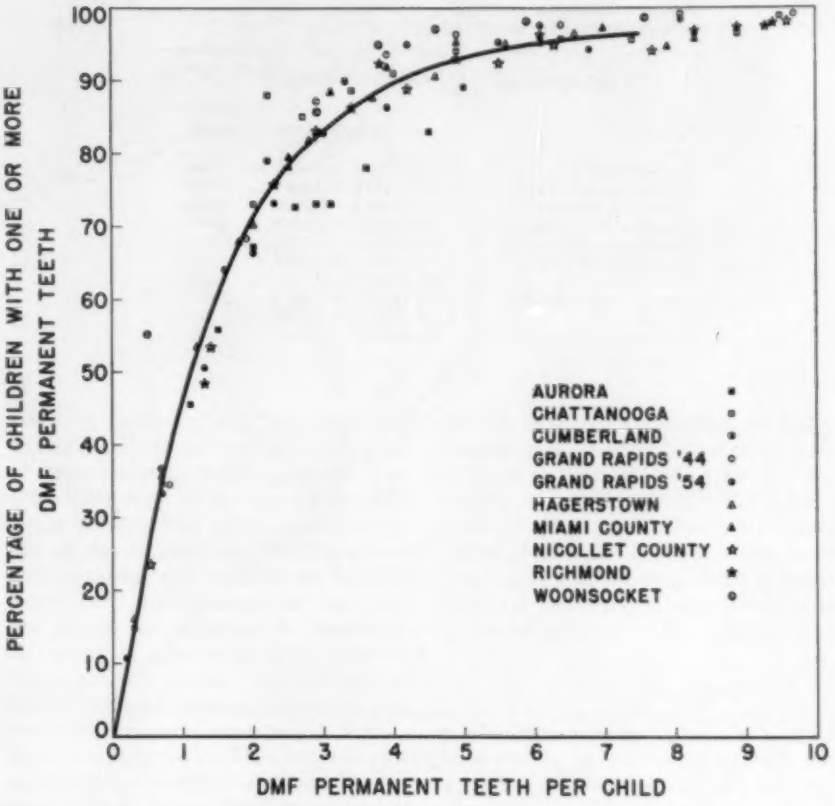

Fig. 3 • Relationship between presence of dental caries in permanent teeth of school children and average number of such teeth affected

A common characteristic of the reports on dental caries prevalence is the assumption that the validity of data on dental caries experience is directly proportional to the detail of the examination findings. It is not widely appreciated, however, that limits do exist beyond which precision of measurement is attained at the expense of adequate numbers of observations. Furthermore, the error of measurement may increase as the detail of examination is increased. Nevertheless, it is not uncommon among those concerned with developing standards for dental caries recording to insist that observations must be reported in terms of DMF tooth surfaces to be reliable. The correlation between DMF tooth surfaces and DMF teeth, therefore, is of special interest and is presented here for the first time.

The correlation between DMF tooth surfaces and DMF teeth is presented for each of the ten dental surveys in Table 2 together with the formulas for the fitted straight lines. The correlation coefficients are remarkably high, the highest being 0.9997 and the lowest being 0.9960. The fitted straight lines for three of the surveys are shown in Figure 4. For the

Table 2 • The correlation between DMF teeth and DMF tooth surfaces, for specified groups of school children

School children	Fitted straight line	Correlation coefficient
All studies	$Y = 1.9282\ x - 0.6889$	0.9898
Aurora, Illinois	$Y = 1.7296\ x - 0.4070$	0.9968
Chattanooga, Tennessee	$Y = 1.9218\ x - 1.2681$	0.9992
Cumberland, Maryland	$Y = 2.2744\ x - 0.9926$	0.9978
Grand Rapids, Michigan, 1945	$Y = 2.0353\ x - 0.9203$	0.9989
Grand Rapids, Michigan, 1955	$Y = 1.9466\ x - 0.7722$	0.9960
Hagerstown, Maryland	$Y = 2.0762\ x - 0.4586$	0.9991
Miami County, Ohio	$Y = 1.9249\ x - 1.1981$	0.9997
Nicolet County, Minnesota	$Y = 1.8225\ x - 0.9726$	0.9973
Richmond, Indiana	$Y = 1.9470\ x - 0.8936$	0.9995
Woonsocket, Rhode Island	$Y = 2.2387\ x - 1.0463$	0.9983

group considered together, the correlation coefficient is 0.989. The formula for the fitted straight line (Fig. 5) is $y = 1.9282x - 0.6889$. Since the correlation coefficients are so close to unity, there would appear to be no gain in precision of measurement and a great waste of valuable time in observing, recording and analyzing DMF tooth surfaces.

DISCUSSION

Most of the dental surveys conducted in the United States during recent years have been for the purpose of making base line data available prior to the institution of controlled fluoridation of the communal drinking water supply. For this purpose and for subsequent evaluation of the program, the survey can be limited to a determination of the percentage of children, by age, having one or more DMF teeth. Furthermore, the number of age groups selected for survey can be limited to three because of the straight line relationship between age and average number of DMF teeth. The close agreement between estimates obtained from such percentages and the observed average number of DMF permanent teeth for Grand Rapids, Michigan children after ten years of water fluoridation is shown in Table 3 and Figure 6.

A five to tenfold saving of dental examination and data processing time can be realized by limiting the observations to a determination of the percentages of children having one or more DMF permanent teeth, rather than making actual counts of DMF permanent teeth. In one hour of examination time, as many children can be classified into the simple dichotomy of having or not having one or more DMF permanent teeth, as can be examined in a five to six hour school day to determine actual counts of DMF teeth.[10] An appreciation of the simplicity and time saving features of this method will do much to facilitate fulfillment of the recommendation that dental caries prevalence data be collected in each community prior to fluoridation.

The immediate and practical usefulness of patterns of dental caries prevalence is not so important as the fact that the existence of such patterns has been established and that a knowledge and understanding of their general form should facilitate the establishment of standard methods for measuring dental caries prevalence.

The high correlation noted between three important measures of dental caries

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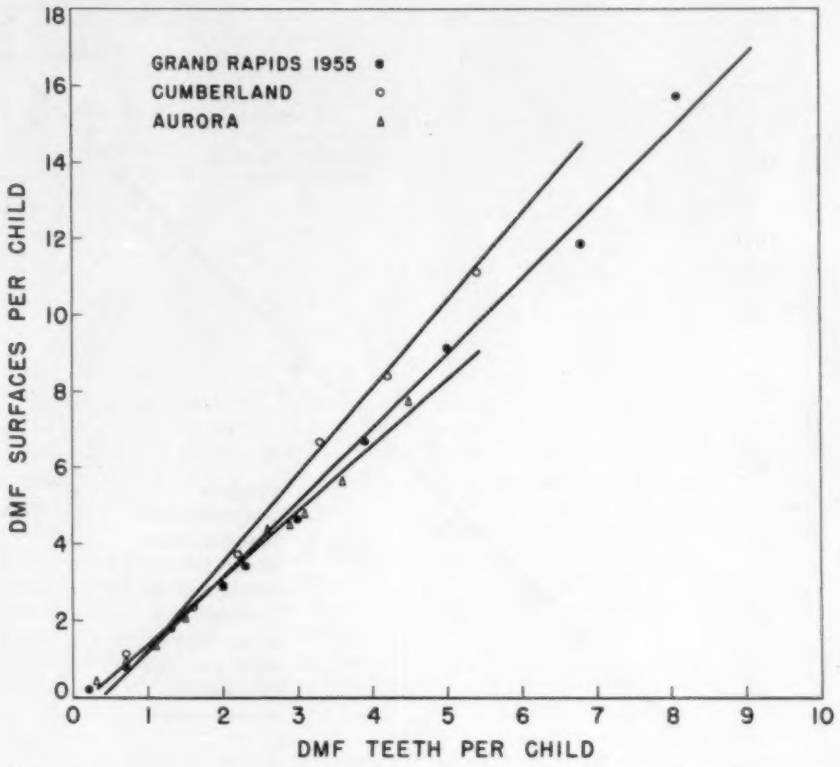

Fig. 4 • Relationship between average number of DMF permanent teeth in school children and average number of DMF surfaces in such teeth, expressed as fitted straight lines for each of three groups of children.

prevalence clearly points to the lack of independence of the various requirements proposed for valid comparisons. The simplest classification, having or not having one or more DMF teeth, involves all index cases in any subsequent effort to refine the dental caries observations. Thus the close association noted between the percentage of children having one or more DMF teeth and the average number of DMF teeth per child, by age; and the high correlation between DMF teeth and DMF tooth surfaces, are reasonable —at least in retrospect. In these instances, as with most relationships where the value of x contributes very largely to y, the correlation will tend to be high.

When the average number of DMF teeth per child for each of the ages 6 to 15 years is plotted by age, there is a tendency for the points to fall in a straight line pattern. The slope of the line provides an estimate of the annual increment or incidence of DMF teeth. There is an even greater tendency for the points to fall along two lines which intersect at the point for children aged 11 years, particularly if the annual incidence is relatively high. Thus the single straight line for ages 6 through 15 years repre-

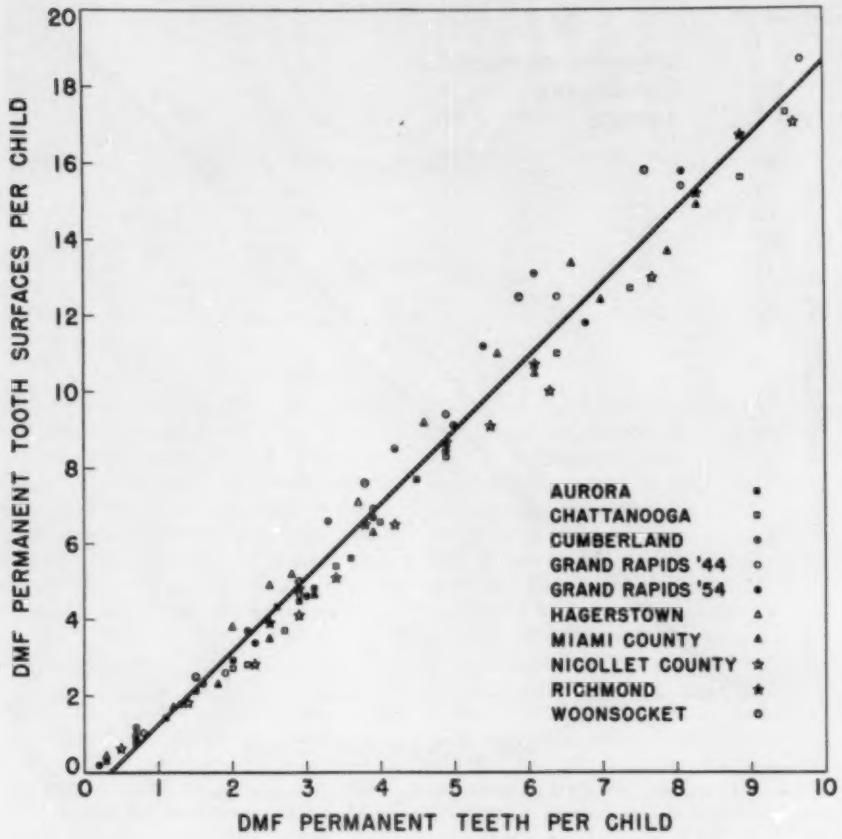

Fig. 5 • Relationship between average number of DMF permanent teeth in school children and average number of DMF surfaces in such teeth, expressed as a single fitted straight line for ten groups of children

sents a compromise between an incidence rate which is somewhat lower for the ages 6 to 11 years than for the ages 11 to 15 years. Obviously, it is also a compromise with a parabolic curve which can be fitted to each of the observed points. Nevertheless, the straight line pattern is selected to describe the trend because it is simple to interpret and because it represents a close enough approximation to afford estimates of dental caries prevalence which satisfy the needs of most dental surveys.

Different methods of dental caries prevalence cannot be evaluated objectively so long as the notion persists that actual counts of DMF teeth or DMF tooth surfaces are precise and therefore possess the virtues of a precision casting, whereas estimates or approximations are at best loose guesses and therefore fanciful. Of course, the actual counts are not and can not be precise. They are approximations too. If this is acknowledged, deviations of actual counts from the

Table 3 • Comparison of the observed and estimated number of DMF permanent teeth per child, by age last birthday, for 3,630 Grand Rapids, Michigan school children, 1955

Age	Observed per cent with one or more DMF teeth	Average number of DMF teeth per child	
		Observed	Estimated
6	10.7	0.19	0.20
7	33.2	0.69	0.67
8	50.6	1.27	1.17
9	66.9	1.97	1.83
10	73.4	2.34	2.20
11	83.2	2.98	3.00
12	86.5	3.87	3.47

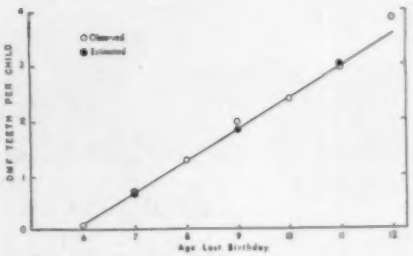

Fig. 6 • Observed and estimated number of DMF permanent teeth per child, by age, for 3,630 Grand Rapids, Mich., school children, 1955

curvilinear trend patterns presented will not be assumed to be due to inadequacies in the curves. It is possible that they may be largely, if not entirely, due to deficiencies in sampling and to errors of observation.

Once the concept of actual counts being approximations is accepted, it becomes possible to explore the kinds of approximations which will satisfy the needs of different types of dental surveys concerned with establishing the level of dental caries prevalence.

One of the most common rationalizations of the detailed dental examination is in connection with surveys in relatively small communities — communities too small to provide an adequate number of children in each age group to give reasonable stability to the observations. In such surveys it is not unusual for the average number of DMF teeth per child, by age, to take on an erratic pattern because the actual counts provide one or more cases of inconsistency; for example, the average number of DMF teeth per child may be greater for children aged 10 years than for those aged 11 years. It is precisely in these surveys that appreciation and understanding of trend patterns are essential. Unless the data are adequate to serve as a guide to the trend which characterizes the group, their usefulness for purposes of a base line or for subsequent comparison will be extremely limited. For purposes of establishing the trend, they are probably of little more value than estimates based on the percentage of children, by age, having one or more DMF teeth. On the other hand, if the pattern is erratic or unusual in one or more respects, and the observations are based on an adequate number of observations, the initial findings should serve as an incentive to the creation of more comprehensive studies which may contribute additional knowledge in the search for cause and effect factors.

SUMMARY

There is a high correlation between DMF teeth and DMF tooth surfaces.

A clear concept and broad understanding of DMF trend patterns are essential to an appreciation of the varying needs of different kinds of dental caries studies and surveys.

Elevation of a serum glycoprotein in periodontosis

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In patients who show diffuse or generalized loss of alveolar bone, constitutional disease is often suspected. Painstaking investigations, which have included chemical and metabolic studies of blood, urine and tissues[1-6] have failed, however, to establish a strong case for a systemic background in periodontosis. Since the tissues which are involved—bone, periodontal membrane and cementum—are connective tissues, this study was made in the belief that the disease might be related to some general process in connective tissue. There is mounting evidence that variations in the level of at least one of the serum glycoprotein fractions, seromucoid, may reflect changes in connective tissue ground substance, representing the diffusible components of the carbohydrate-protein complexes.[7-12] Therefore, seromucoid levels, measured as the bound hexose, were determined in a group of normal persons and in a corresponding group of patients exhibiting general loss of alveolar bone. The blood level of this glycoprotein was shown to be elevated in over 40 per cent of the patients with periodontosis.

MATERIALS AND METHODS

Selection of Patients • Sixty-two patients with periodontosis were included in the group. Diagnosis of the disease was based upon roentgenographic evidence of extensive vertical loss of interseptal bone (Fig. 1), and clinical evidence of loosening and migration of the teeth in the presence of relatively normal appearing gingival tissues (Fig. 2). Each subject

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*Professor of orthodontics, College of Dentistry, University of Illinois.

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‡Assistant professor of oral surgery, the Dental School, Northwestern University.

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12. Silberberg, S., and Catchpole, H. R. Orosomucoid and protein content of nasal polyps. Fed. Proc. 15:171 March 1956.

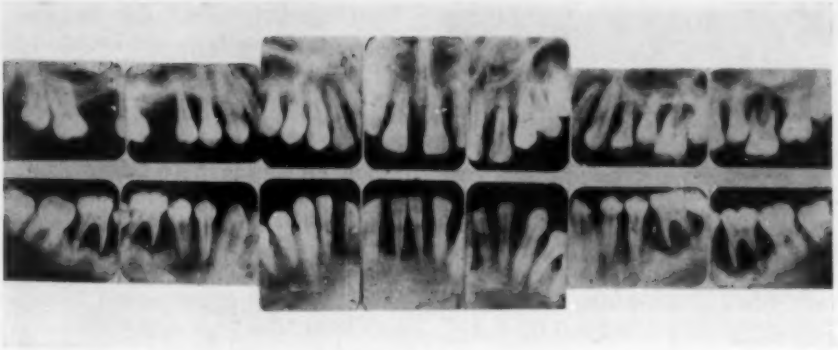

Fig. 1 • Diffuse resorption of the alveolar bone in typical case of periodontosis. Patient is 29 year old woman

was carefully questioned about his medical history and, on this basis, those with any indication of a metabolic disturbance, endocrine dysfunction or chronic systemic disease were excluded from the series. Of the 62 patients studied, 18 were males and 44 were females. Their ages ranged from seven to 70 years, with a mean of 36 ± 13 years (Fig. 3). Forty of the subjects were in the 20 to 40 year age group. As controls, 49 patients with clinically and roentgenographically normal periodontal tissues were selected. This group included 17 males and 32 females. The age range was 12 to 66 years, with a mean of 33 ± 15 years (Fig. 4). Twenty-six of these subjects were between the ages of 20 and 40.

Analytic Methods • For the seromucoid determination, 5 ml. of blood was withdrawn by venipuncture in the antecubital fossa. Measurements were made on 1 ml. of the serum, using the method of Winzler and others.[13] Briefly, this involves the precipitation of most of the serum proteins with perchloric acid, followed by the precipitation of seromucoid from the filtrate with phosphotungstic acid. The glycoprotein is determined as hexose using the orcinol reagent against a mannose-galactose standard. To check further on the composition of the seromucoid, the tyrosine content was also determined, using the Folin-Ciocalteu phenol reagent and a tyrosine standard.

Seromucoid • The group of glycoproteins composing the seromucoid fraction migrate in the main with the alpha globulins on electrophoretic separation. The major moiety is orosomucoid, a glycoprotein characterized by a very low isoelectric point and ready solubility.[14] The hexose concentration of seromucoid, largely mannose and galactose, is around 15 per cent. No uronic acid is present.

RESULTS

The mean value for seromucoid levels in the serum of normal patients, expressed as mannose-galactose content, was 16.8 ±3.6 mg. per 100 ml.

In the group of patients with periodontosis, the mean value was 19.8 ± 5.5 mg. per 100 ml. When it was evaluated by statistical methods, the difference between these two means was shown to be

13. Winzler, R. J., and others. Studies on the mucoproteins of human plasma; determination and isolation. J. Clin. Invest. 27:609 Sept. 1948.

14. Winzler, R. J. Determination of serum glycoproteins. Methods of biochemical analysis, II. New York, Interscience Publishers, 1955, p. 279.

Fig. 2 • Same patient as in Figure 1. There has been considerable loosening and migration of the anterior teeth

highly significant: $P<.001$. In normal patients, the tyrosine content of the seromucoid was 3.5 ± 0.5 mg. per 100 ml., as against 3.8 ± 0.8 mg. per 100 ml. for the periodontosis group. This difference, $P<.05$, may be considered barely significant. The mean carbohydrate-tyrosine ratios, 4.8 ± 1.3 for the control and 5.2 ± 1.2 for the experimental group, did not differ significantly. This would suggest that the seromucoid fractions are qualitatively similar.

Approximately a third of the patients with periodontosis showed elevated seromucoid levels of 22 mg. per 100 ml. or higher; that is, values in excess of one and one-half times the standard deviation of the control group (Fig. 5 and 6). Slightly over half of the patients with periodontosis showed seromucoid values lying within the normal range (Fig. 6).

SIGNIFICANCE OF RESULTS

The seromucoid level of the serum is elevated in a sizable segment of patients with periodontosis. This observation is allied to a recent study showing elevated serum globulin levels in this disease.[15] Also, Domecq and others[16] have reported elevation of the serum mucoproteins and alpha globulins in persons showing alveolar bone resorption as part of a syndrome which they called secondary hyperparathyroidism.

Although all of the patients with periodontosis in our study showed loss of alveolar bone in the roentgenograms, only about 40 per cent had a significant elevation of the seromucoid level. Since the changes in the bone associated with periodontosis are largely irreversible, one cannot distinguish roentgenographically between past and present episodes. The rise in seromucoid levels may signalize an active state of the disease and the determination of this serum protein fraction could be of value in making a distinction between active and inactive states of periodontosis.

We believe that seromucoids are related generically and chemically to some glycoproteins of connective tissue. Such a relationship was first suggested by Gersh and Catchpole.[7] Histochemical, analytical and immunochemical results have reinforced this view by identifying in connective tissues soluble glycoproteins which do not contain uronic acids but which are rich in hexose.[8-10, 17-20] They can be precipitated from tissue extracts using a modification of the method which Winzler and others developed for blood.[12] Such glycoproteins react with antibodies produced against orosomucoid, the glycoprotein which forms the bulk of the seromucoid fraction.[12]

It is important to understand the relationship between the connective tissue glycoproteins and those of blood in order to hazard an explanation of the elevated

15. Salpeter, M.; Sternberg, N., and Katchalsky, A. Lowered serum albumin content in periodontosis. New York State D. J. 18:476 Nov. 1952.

16. Domecq, R., and others. Hiperparatiroidismo secundario—patogenia y clinica. Rev. argent. endocrinol. metab. 2:348, 1956.

17. Engel, M. B. Water-soluble mucoproteins of the gingiva. J. D. Res. 32:779 Dec. 1953.

18. Glegg, R. E.; Eidinger, D., and Leblond, C. P. Presence of carbohydrates distinct from acid mucopolysaccharides in connective tissue. Science 120:839 Nov. 19. 1954.

19. Moses, L., and Catchpole, H. R. Determination of water soluble mucoprotein fractions in normal and estrogen-stimulated tissues. Fed. Proc. 14:104 March 1955.

20. Leblond, C. P.; Glegg, R. E., and Eidinger, D. Presence of carbohydrates with free 1, 2-glycol groups in sites stained by the periodic acid-Schiff technique. J. Histochem. Cytochem. 5:445 Sept. 1957.

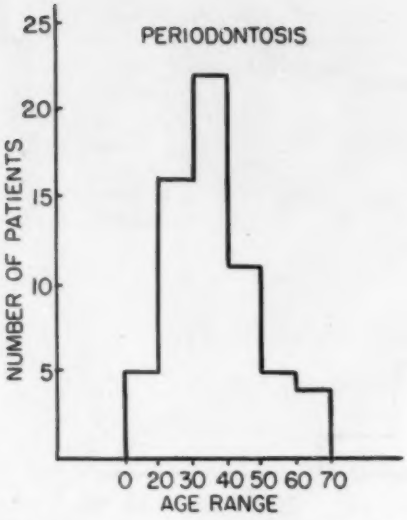

Fig. 3 • Age distribution of 62 patients with periodontosis

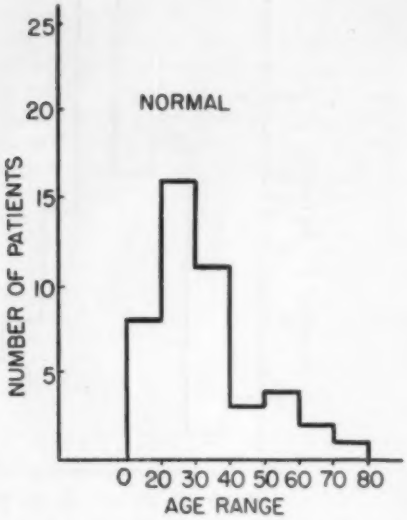

Fig. 4 • Age distribution of 49 patients with clinically and roentgenographically normal periodontal tissues

seromucoid levels observed in many states where connective tissues are reacting. Such changes are seen in certain of the "collagen diseases,"[14] in animals bearing tumors,[8] in experimentally produced scurvy[9] and in the bone resorption which follows the administration of parathyroid extract.[10,11] These elevations have been labeled "unspecific," as signifying a process of "tissue destruction" of ill-defined and unknown nature.[14] On the contrary, the various states show in common certain well-defined changes in the connective tissue ground substance which can be recognized by alterations in chemical properties, physicochemical behavior, vital staining, and reactivity as histochemically determined.[7,21,22] These changes have been related to a disaggregation of the carbohydrate-protein complexes of the ground substance, with the formation of water soluble moities which can diffuse into the blood to form a part of the seromucoid fraction.

In periodontosis, the elevated seromucoid levels could be attributed either to the liberation of diffusible glycoprotein from the local destruction of bone, periodontal membrane and cementum, or to a more general process embracing the entire connective tissue system. Although the results of this study do not discriminate between these two possibilities, it seems reasonable to assume that the pathologic alterations occurring in the periodontium alone could not produce the observed blood changes. In a group of 11 patients who were receiving orthodontic treatment, where a local bone reaction would be expected, there was no significant elevation in the serum glycoprotein levels (before treatment, the level was 18.9 mg. per 100 ml.; during treatment, the level was 18.1 ± 5.0 mg. per 100 ml.).

21. Engel, M. B.; Joseph, N. R., and Catchpole, H. R. Homeostasis of connective tissues. I. Calcium-sodium equilibrium. A.M.A. Arch. Path. 58:26 July 1954.

22. Joseph, N. R.; Engel, M. B., and Catchpole, H. R. Homeostasis of connective tissues. II. Potassium-sodium equilibrium. A.M.A. Arch Path. 58:40 July 1954.

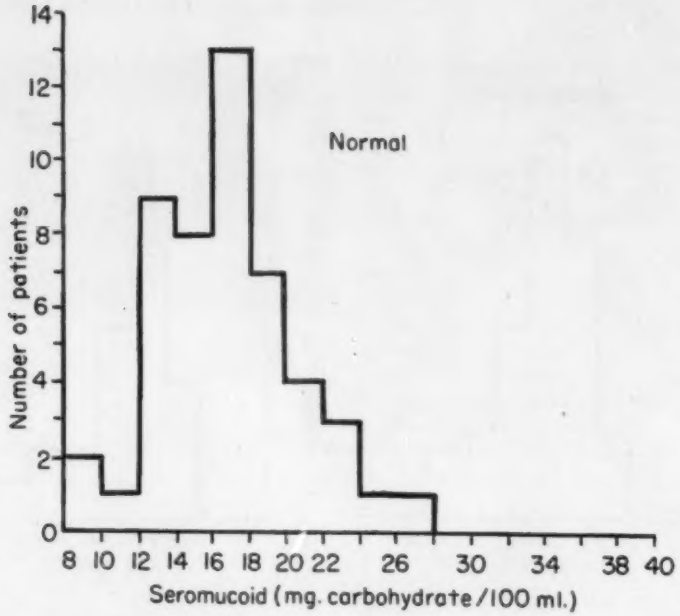

Fig. 5 • Seromucoid levels in normal patients. Mean value is 16.8 ± 3.6 mg. per 100 ml.

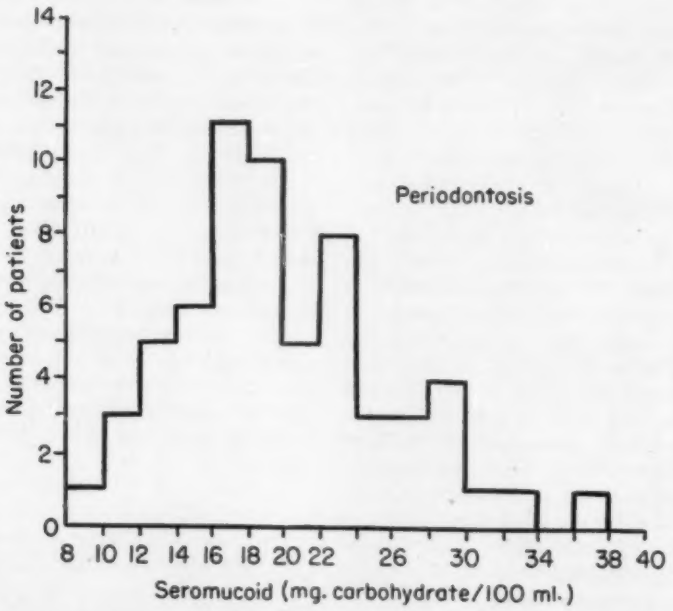

Fig. 6 • Seromucoid levels in patients with periodontosis. Mean value is 19.8 ± 5.5 mg. per 100 ml.

In our opinion, the oral changes in periodontosis are merely one manifestation of a more widespread change in connective tissue.

SUMMARY

Elevated levels of a serum glycoprotein fraction, seromucoid, were measured in over 40 per cent of a group of patients with periodontosis. The relationship between seromucoid and labile components of connective tissue was discussed. It was tentatively proposed that the changes in the periodontal structures associated with periodontosis represent one aspect of a more general reaction of connective tissues.

Psychological factors in the practice of dentistry

Alex H. Kaplan, M.D., St. Louis

Patients come to see a dentist because they are concerned with dentofacial pain, oral inflammatory processes or dentofacial deformities. They come with full recognition that the dentist, fortified with his scientific knowledge, surrounded with the culturally accepted concept of an authority and the aura of a healer, will take care of all the pain and suffering whether it be of physical or psychological origin. It makes little difference to the patients that the origin of the dental suffering may be related to some emotional conflict. They still expect the dentist to take care of them.

Dentists are aware of the intense psychological significance of the mouth. They know that most patients come for treatment with great confidence, cooperate with dental procedures and show gratitude for the relief of dental pain or the restoration of dental function. However, there is a significant group that reacts to dental manipulations as an oral threat to the mouth, teeth or gums with either overt or repressed anxiety, the latter evidenced by hostility, avoidance, restlessness, gagging and exaggerated reaction to pain. It is this latter group which will receive major attention in this article.

ORAL PERIOD OF DEVELOPMENT

Evolutionary processes change the mouth from a passive intaking organ to one which is active and biting. The face becomes mobile and capable of expressing fear, rage or affection. Organs associated with the mouth develop into glands of internal secretion (part of the pituitary and the thyroid glands). The mouth is the first physical and emotional contact with the world. It is the first organ by which the infant gains an awareness of the outside; the baby tests reality by placing objects in his mouth; he takes in what is pleasurable and spits out the unpleasurable. Subsequently, all of the oral behavior becomes intimately associated with the other visceral activities.[1] The personality traits laid down in the first year of life are maintained in adulthood

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1. Grinker, Roy R. Psychosomatic research. New York, W. W. Norton & Co., Inc., 1953, p. 105-141.

although they are affected by later emotional and physical development. Because these oral character traits act as the basic foundation for future psychological development, psychiatrists accept the fact that the dentist works in one of the most sensitive areas of the body.

DEVELOPMENT OF ANXIETY

It is during this early oral period that the child develops patterns of behavior in accordance with the many factors in his psychological and physiological development. Included are heredity, constitutional factors, the child's maturation schedule, the parent-child relationship, illness, injury, and birth of siblings, as well as the other normal and abnormal stresses of the environment. Satisfaction of oral needs leads to satiation and lack of tension. Lack of satisfaction results in increase of tension, the prototype of anger and hostility. If this tension continues to develop, the infant develops anxiety and fear of the outside object.[2]

These early patterns of reactions become part of the buried memories of the child, to be reactivated at new points of stress such as dental manipulations. As the child develops, the anxiety which had its prototype in the physiological reaction of the newborn becomes the individual's reaction to danger, whether it be from the stresses of the outside world, from the inner conscience or from the unconscious part of the mind. The body equilibrium is maintained and defenses tightened at the first signal of anxiety. When tension increases and the anxiety becomes more disruptive, psychophysiological reactions and neurotic, psychotic or other behavioral symptoms such as delinquency may develop as a defense against the anxiety. Usually, the individual reacts with the same learned pattern of somatic disturbance or psychological reaction regardless of the stimulus. In reaction to stress, one individual may develop an ulcer; another, neurotic anxiety or abnormal fears; a third, psychosis; and a fourth, other personality disorders.

PSYCHOSOMATIC VERSUS NEUROTIC REACTIONS

The term "psychosomatic" is fast becoming one of the most misused terms in the field of dentistry. Whereas it has been used in a general way to indicate the effects of emotions, more recently it has even encompassed the use of hypnosis in the practice of dentistry. Historically, the term psychosomatic was first used by physicians to stress the relationship between the psyche and the soma. Later, more specifically, psychosomatic referred to the somatic visceral changes resulting from stimulation of the central nervous system by recurring emotional attitudes, an expression of unconscious emotional conflict. Many diseases have become commonly known as psychosomatic disorders (asthma, duodenal ulcer, hypertension, and so forth). However, this draws an unwarranted distinction between these specific diseases and all others, for it is now commonly accepted that the human being responds as a whole unit to all forms of stress whether it be mental or physical. Psychological factors may be responsible for structural changes and physical disease and, conversely, structural changes and physical disease can be the most important etiological agent for pathological emotional states.

Strictly speaking, the neurotic reaction is different from the psychophysiological reaction (the latter a term recently substituted for psychosomatic and reserved for those disorders where emotional factors play a major role). People with psychophysiological disease have no overt conscious anxiety. They do not feel they

2. Grinker, Roy R. Psychosomatic approach to anxiety. J. Am. Soc. Psychosomatic Den. 4:13 Jan. 1957.

have emotional problems, and the physical illness itself has no emotional meaning. The duodenal ulcer and the hypertension have no symbolic meaning. They are the end products of recurring emotional attitudes, the result of conflict via the central nervous system, especially the autonomic system. Continually recurring hostile feelings, unperceived and blocked in their discharge in conjunction with some unknown physical factor, can stimulate the sympathetic nervous system to cause constriction of blood vessels, until hypertension develops with the irreversible changes leading to cardiovascular renal disease. The individual who, as a result of heredity, constitutional factors, past experiences and present traumatic situations, feels threatened and has a regressive need to be taken care of as a child, may be stimulating his parasympathetic system through the vagus nerve to produce more pepsinogen and stomach acid (in anticipation of being fed), which may lead to the development of an ulcer.

On the other hand, the tense, anxious neurotic may complain of many physical symptoms but he usually has no organic disease. Symptoms of anxiousness, phobias (abnormal fears) or compulsions (irrational repetitive acts) can be interpreted as having special symbolic meaning referable to the emotional conflict. But there are no physiological changes of sufficient degree to lead to organic disease. The cardiac neurotic is extremely anxious and concerned about his heart, but the heart is not affected. However, the driving, successful, perfectionist businessman with repressed conflicts and no obvious emotional symptoms may develop coronary artery disease, which is said to have an emotional etiology along with a physical predisposition.[3]

PSYCHOPHYSIOLOGICAL REACTION

In the past several years an increasing number of investigators have postulated that periodontal disease and dental caries have psychophysiological components as a result of recurring emotional attitudes which lead to reduced salivary flow, modification of the enzymatic character of the salivary secretions, lowering of the pH of the mouth and a reduction of the calcium level of the blood. All of these changes are said to have a direct effect on dental disease.[4-11] Statistical research using psychometric studies seems to indicate a positive correlation between anxiety and dental disease.[11, 12] Dental caries is known to become rampant in preadolescence and adolescence, periods of great emotional stress for the growing child.[13] Whether these psychological stresses are more important than the many physiological, dietary and dental hygienic changes present in all age groups, remains to be proved.

EMOTIONAL FACTORS AFFECTING DENTAL DISEASE

The majority of dental patients are not neurotic nor do they have any psychophysiological illness. Their problems are affected by emotional factors which com-

3. Alexander, Franz. Psychosomatic medicine. New York, W. W. Norton & Co., Inc., 1950.

4. Trimble, H. C.; Etherington, J. W., and Losch, P. K. Rate of secretion of saliva and incidence of dental caries. J. D. Res. 17:299 Aug. 1938.

5. Rosebury, Theodor. Etiological factors in periodontal disease. Oral Surg., Oral Med. & Oral Path. 5:473 May 1952.

6. Moulton, Ruth; Ewen, Sol, and Thieman, William. Emotional factors in periodontal disease. Oral Surg., Oral Med. & Oral Path. 5:833 Aug. 1952.

7. Klapper, C. E. The effect of salivary gland extirpation on experimental dental caries in the Syrian hamster. J. Am. Col. Den. 23:186 June 1956.

8. Haldi, J., and Wynn, W. Some observations on the effect of pH on teeth. J. Am. Col. Den. 23:189 June 1956.

9. Strongin, E. J., and Hinsie, L. E. Parotid gland secretion in manic depressive patients. Am. J. Psychiat. 94:1459 May 1938.

10. Giddon, D. B., and Lisant, V. F. Enzymic change in parotid saliva as related to psychopathology. J. Am. Col. Den. June 1956.

11. Manhold, John H. Introductory psychosomatic dentistry. New York, Appleton-Century-Crofts, Inc., 1956.

12. Miller, S. C.; Thaller, J. L., and Soberman, Alexander. Use of the Minnesota multiphasic personality inventory as a diagnostic aid in periodontal disease. J. Periodont. 27:44 Jan. 1956.

13. Massler, Maury. Teen-age caries. J. Den. Children 12:57 Third quarter 1945.

plicate rather than specifically cause dental disease. In addition, the emotional factors influencing the doctor-patient relationship have a direct bearing on the problem of the general treatment of dental disease.

Nearly all dental patients do not have obvious emotional disorders, but they all have differing personality traits, or psychological defenses, which make them react in specific ways to dental manipulation; some react without anxiety and others with varying degrees of anxiety. Dentists do not treat an isolated mouth. There is a person attached to the mouth and around the person is a family and a larger cultural group. The dentist treats the whole person with a dental problem. It is therefore necessary to understand the basic personality development of normal individuals and those customary variations which the dentist may meet in his practice. A study of the science of psychodynamics should be an integral part of the curriculum of every dental school. In addition, experience through clinical rounds should be available in order for dentists to learn how to use this psychodynamic knowledge in dental treatment.

As indicated earlier, the dentist works in one of the most sensitive areas of the body. The teeth have symbolic meaning arising from experiences in early years, and their damage or loss is overreacted to by most people.

Some patients expect to be painfully hurt during treatment. It is no accident that the concept of pain involved in the practice of dentistry has received a very large play in comics and cartoons generally; the dentist is caricatured as an aggressor who works with destructive and painful weapons. Because the dental process is frequently a surgical one, a reactivation occurs of the childhood fear of mutilation which exists in all people at all times but is more exaggerated in neurotic individuals. Primal anxiety is due to the fear of loss of mother or love of parents, and the child begins to fear bodily punishment during the third and sixth years; this is the period of normal nightmares and concerns of the dark and the unknown. It is the period when every boy seems to be bristling with guns and comes to the doctor's office fully armed (a reaction against the fear of bodily harm). This fear of bodily punishment is repressed as the child develops, but it is reactivated at points of threatening aggression and body injury, such as surgery of any kind.

Details from psychoanalytic observation of some dental patients show that in phantasy and dreams the dentist may appear as a mutilator and an aggressor.[14] However, it must be emphasized that to other patients the dentist is a powerful father figure who can relieve pain, restore dentofacial function and magically bring about cherished hopes of success in business and marriage, or the restoration of youth.

PSYCHOLOGICAL REACTIONS TO DENTAL PROCEDURES

Although it is often difficult to definitively correlate the exact physiological mechanism by which anxiety causes subjective pain or organ dysfunction, this is not true with the mouth and teeth, which are constantly used to express feeling. To illustrate: one may clench his teeth in anger or determination or gnash his teeth in rage and frustration. From early infancy, the mouth is used as a source of sensory pleasure through the acts of sucking, eating and kissing. It is also used as a weapon of attack or defense by biting, arguing or attacking with words. Malocclusions may result: infantile, dependent persons often prefer soft, children's food for an abnormally long time; the resultant lack of jaw muscle tone may play a role in causing malocclusion. Also,

14. Savitt, Robert A. Teeth, trauma and the dentist-patient relationship. J. Hillside Hosp. 5:392 Oct. 1956.

bruxism is an attempt to overcontrol anger and occurs in those persons who do not know how to express rage or who suffer from disproportionate anger. Although it may frequently begin as a conscious controlling device, clenching of the jaw becomes self perpetuating, leading to muscle spasm and resulting pain. This leads to a vicious cycle because the new pain is often released by increased clenching which causes more pain. Over 50 per cent of patients complaining of temporomandibular joint pain studied by a psychiatrist, Ruth Moulton,[15] were not aware of their defensive bruxism. Only four of 35 patients with bruxism studied were found to be relatively emotionally healthy.

The tense patient reacts more strenuously to pain. Past experiences may be set up in a closed self re-exciting chain reaction within a neuronal pool. This helps to explain hypersensitivity to pain based on past trauma. When a patient reacts to dental manipulation with excessive pain, it does not mean he is merely exaggerating to bedevil the dentist. It may indicate that the patient is trying to communicate to the doctor that he needs help because of excessive emotional reactions to the dental manipulative procedure.[15] Such reactions often lead a patient to delay visits to the dentist, thus encouraging dental disease.

Another group of patients attend assiduously to the cleaning and brushing of their teeth until by mechanical means abrasions and deformities of the teeth may result. The need which such persons have to devote so much care and attention to the teeth and to remove all contamination points up the significance which both the teeth and cleanliness have for them. To these persons dirt has a symbolic meaning and is a threat to their integrity. Their underlying aggression is defended against by conformity and compulsive cleanliness.

Picking at the teeth may be a means of relieving anxiety just as biting of the nails and sucking of the thumb serve to protect the child against tension. All of this behavior protects the individual against anxiety, but the other aspect of this activity is the self destruction or self injury which is true of all psychological symptoms. Every emotional symptom is a combination of wish fulfillment and self punishment.

There is another less common dental patient who uses dental manipulative procedures to bring on self injury and punishment for masochistic needs and relief of tension. He can and does submit to the most painful dental procedures. He seeks to have his teeth pulled even before the dentist suggests it. To such patients the removal of teeth may symbolize a return to an infantile state which is both desired and disdained.

The dentist must also pay attention to the reactions of mentally ill patients or seriously disturbed neurotic patients to the dental manipulative procedures. Often a prepsychotic patient will begin to show his pathological symptoms after teeth extractions or active dental repair work. These patients are psychiatrically ill and need referral to medical sources for diagnosis and treatment, although the first diagnostic step will be taken by the dentist.

The effect of dental deformities on the personality is well known, and is often more pronounced in the female. The face has been described as the show window of the mind and body, and dentofacial deformities constitute an ever present source of suffering. Dentofacial deformities are a true organ inferiority which must affect the growing personality of the child, because it distorts the body image. Malocclusions can lead to maladjustments and unhappy lives, through feelings of inadequacy and inferiority. The orthodontist does not only straighten

15. Moulton, Ruth. Psychologic consideration in the treatment of occlusion. J. Pros. Den. 7:148 March 1957.

teeth, he helps straighten out potentially disturbed personalities. There have been many examples of painfully shy persons with cleft palates and malocclusions whose entire personalities were changed with proper dental treatment.

PSYCHOLOGY OF DENTIST-PATIENT RELATION

What does all of this mean for the general dental practitioner or the dental specialist who, after all, is not a trained psychiatrist? Simply that the dentist must treat the whole patient and must develop personal technics for understanding his patients and their differing personalities. To speak of the revered general practitioner's good bedside manner or dental technic is to talk of his recognition, either consciously or unconsciously, of those interpersonal factors present in every doctor-patient relationship; dentists must learn to recognize these factors and then to handle them adequately. The mildly hostile, anxious, or depressed reactions of patients must be seen as directed not against the dentist but as manifestations of dental anxiety regarding the oral attack. The overcomplying patient and the patient who denies all evidence of dental pathology are routine patients who must be handled each in his own way. Some patients have exaggerated anxiety reactions to corrective appliances and operative procedures and may even overreact to the close, intimate contact which is unavoidable in the dental office.

It must be emphasized again that the reaction of the patient to the dentist will more often be positive than negative. The dentist is a healer and as such has the aura of all the generations of healers from the witch doctor to the present highly trained specialist. The patient also feels that here is someone to take care of him. It is this attitude of the patient (transference) that makes it possible for the dentist to alleviate so many of the anxieties generated by dental manipulation and to gain the patient's gratitude for the relief of dental pain.

Perhaps one of the most important factors in the doctor-patient relationship is the attitude of the doctor himself. The unhappy, physically sick, emotionally deprived, fatigued doctor finds it difficult to react to any tension in his patient without a corresponding rise of his own tension, which is translated into irritability, annoyance, withdrawal or overtreatment. The close and prolonged personal relationship so necessary in dental treatment (even more so than in medical treatment) facilitates such reactions unless the doctor has developed a matureness and personal understanding of some of his own normal emotional needs as well as those of the patient. Everyone has personal needs which must be gratified before a healthy relationship with a patient can be sustained. Such gratifications come through the creativeness in one's work with adequate monetary or substitute compensations and through the normal healthy relationship with wife, children and friends, or an interest in hobbies. When the doctor is fortified with such gratifications, there will be no need to overreact to patients, either in a positive or negative direction.

Doctors have differing reactions to passive, tense or restless (hyperkinetic) patients. Some would like to push against the passivity of some patients or restrain the restless ones; others react uneasily to the tense ones. More dentists are afraid of children than vice versa. The dentist should pay attention to his own basic personality and decide if he enjoys seeing children or if he would prefer working with older patients. If he intends to have children as patients, he must accept the reality of having to spend more time in preparation for treatment than with adults, but the rewards can be substantial in terms of continued cooperation.

In general, it should be understood that when dental patients show tension or anxiety exhibited as anger, irritability,

mild depression, restlessness, gagging, unease, overtalkativeness, and so forth, it is not directed against the doctor but against the oral attack. The use of supportive psychological measures such as reassurance, encouragement, persuasion, warm acceptance, and explanation and clarification of procedures and technics can alleviate much dental tension. Technics to develop a firmer identification with the dentist through discussion of the patient's background, friends and their common dental needs encourage the beginning of a therapeutic relationship. Often, encouraging verbal hostility to allow an expression of feeling is in order. The use of kind but firm attitudes in reaction to some patients may also be supportive.

THUMBSUCKING

Persistent thumbsucking in a child, as evidence of inner emotional tension, is claimed to be a factor in dental malocclusion.[16] [17] However, some deny this. Ruttle and others[18] conclude by stating that "Contrary to most publications, the effect of thumb and finger habits on the molar occlusion merely approaches statistical significance, and does not attain clinical utility."

Korner and Reider[19] made a psychological study of three children under six years of age whose thumb and tongue sucking were disrupted by a dental appliance for a period of 12 to 27 months. All of the children had highly personal reactions to the appliance. Two side effects common to the three were activation of hostility and guilt reactions. The appliances failed to stop the thumbsucking in all three and intensified it in two. Because the period between three and six years of age is a very crucial one, dental devices or other manipulations may burden this developmental phase and increase its conflicts. Thumbsucking may normally be given up before the crucial period of the eruption of the permanent teeth.

After the age of six, when the child's energies are turned to the outside, he is more sensitive to his appearance and to teasing by his peers, so that thumbsucking is usually given up. Necessary orthodontic treatment is more readily acceptable and less traumatic in the preadolescent period. Because of the divergence of dental opinion as to the effect of prolonged thumbsucking on malocclusion, the authors advocate postponing dental treatment where appliances are indicated until a later age. They also emphasize the need for further research.

Starr[20] has advocated a firm frontal approach by parents and orthodontists to thumbsuckers during the crucial period from two to four years of age. "Parents are encouraged to utilize such deterrents as ill tasting medication and finger guards. At the same time, the child should be afforded with intrafamilial and peer experiences that are more gratifying and stimulating to the point of hopefully aiding his distraction from the isolated and non interpersonal pastime of thumbsucking." Because the benign types of thumbsucking will respond quickly to a counseling approach with both the child and the parent, Starr has advocated a three month period to test the reversibility of the symptom as well as the questionable mode of parental management and child care. This therapeutic trial, he stated, is a reliable method of differentiating the benign and more malignant forms of the habit; moreover, because intractable thumbsucking is a chronic defense, it should be investigated psychologically, with referral to a child psychiatric center.

16. Meck, Edward S. The dilemma in the management of thumbsucking. J.A.D.A. 43:33 July 1951.

17. Sweet, C. A. Thumb- and finger-sucking by children. Am. J. Orthodont. 34:1017 Dec. 1948.

18. Ruttle, A., and others. A serial study of the effects of finger-sucking. J. D. Res. 32:739 Dec. 1953.

19. Korner, A. F., and Reider, N. Psychologic aspects of disruption of thumb-sucking by means of a dental appliance. Angle Orthodont. 25:23 Jan. 1955.

20. Starr, P. H. Psychiatric aspects of thumb sucking as it relates to dental malocclusion. Washington Univ. D. J. 22:4 Nov. 1955.

My own personal attitude concerning thumbsucking leads me to conclude that the emotional disadvantage of the dental appliance at an early age will outweigh the effect of the dental malocclusion on the personality of the patient. However, the use of psychological technics by the family, dentist or child psychiatrist, depending on the severity of the emotional defenses, is to be encouraged.

BRUXISM

Patients affected by other syndromes, such as bruxism or temporomandibular joint dysfunction, usually do not desire psychiatric treatment. According to Ruth Moulton,[15] a dental approach based on an understanding of the tensions involved is more important than the use of repetitive dental treatment which may tend to fix the symptoms. Often a clarification of what the patient is doing serves to draw his attention to the origin of the problem. This draws a connection between the anxiety and the physical symptoms and helps to redirect the patient's attention to the real source of his difficulties. It is not necessary to refer such patients to a psychiatrist or to learn to take a psychiatric history. Listening to the patient rather than working on him immediately may result in the recognition of significant etiological tensions. Unsatisfactory handling by past dentists may be a factor. Radical dental treatment should be avoided. Sometimes telling the patient that he is suffering from a tensional syndrome rather than real structural pathology may be a great help.

HYPNOSIS

Hypnosis as a treatment procedure to overcome some of the problems herein discussed has been advocated by some dentists for many years. The history of hypnosis antedates psychoanalysis and much of modern psychiatry. It has been used and misused off and on since the last half of the nineteenth century. It became more popular following World War II, when it was used for the treatment of traumatic war neuroses. Hypnosis is essentially a psychiatric treatment procedure utilizing suggestion. But it is more than simple suggestion to relax patients which is used in the everyday practice of dentistry. The transference attitudes developed as a result of the doctor-patient relationship allow the patient to respond to suggestive statements which may result in compliance or trancelike states. This may aid in the alleviation of pain or other psychological reactions, encouraging greater cooperation with dental treatment.

However, such a therapy technic is not without dangers, because by its very technics it encourages dependency and regressive attitudes on the part of the patient which may lead to psychosis or the development of serious emotional trauma. It is a repressive type of therapy which does not solve basic emotional problems. On the practical side, hypnosis requires more time than usual from the dental practitioner; it may not be more effective than procaine; it cannot be used routinely and it thus may complicate dental treatment. My personal feeling about hypnosis in dentistry is that it is a specialized tool of psychiatry and should not be used unless the dentist is ready and able to face the complications which may develop, which means the dentist should be a trained practitioner both in the field of psychiatry and dentistry.

SUMMARY

Psychological factors may, as a result of recurring emotional states and anxiety, cause physiological changes and dental disease. Conversely, dentofacial deformities may have a significant effect on the growing personality. But in the majority of patients, emotional factors complicate rather than specifically cause dental disease. Furthermore, the emotional factors

influencing the doctor-patient relationship have a direct bearing on the problem of the general treatment of dental disease. Most dental patients are neither neurotic nor do they have psychophysiological problems. However, they may react to dental manipulations with tension or anxiety equivalents such as avoidance, excessive reaction to pain, gagging or irritability. This makes it essential for the dentist to treat the person as a whole, considering his psychological reactions as well as his obvious dental disease. The importance of recognizing that the emotional reactions of patients are usually directed at the oral attack, and not the dentist himself, must be emphasized.

Besides learning more about normal personality development and its customary variations, the dentist must learn to guard himself carefully against too many frustrations. He must have his normal emotional needs gratified as the first step in understanding his patients' emotional reactions. In order to facilitate the dentist's understanding of personality traits and their effect on dental care, it is hoped that theoretical and practical courses on the development of personality and the science of psychodynamics will become prerequisites in all dental schools.

Dental management of adult patients with cerebral palsy

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In the United States there are approximately 550,000 patients with cerebral palsy, and, of these, 30 per cent are adults.[1] At present the majority are children, but, in the future, more children will reach adulthood because of advances in the care and management of the disease.[2] Consequently, improvements in the procedures of dental reconstruction for these patients will become more urgent.

From the standpoint of dentistry, cerebral palsy patients offer a challenge because of their inability to cooperate. Only during the last ten years has there been any interest in this problem,[3-5] and then only at isolated dental centers and mainly for children.

The most difficult problem of all in cerebral palsy is securing adequate relaxation and reducing excess motion in the patient so that dental work can be done. In the past, premedication has been tried with incomplete success. Mephenesin is effective in some instances, but not all, and the barbiturates are of limited

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value. Restraints and mouth props are standard accessories in the management of these patients. In some patients with mild conditions and in almost all those with severe conditions, it has been necessary to resort to hospitalization and general anesthesia for dental reconstruction.

In this paper a procedure will be described for clinical management of the most severely afflicted adult patients with cerebral palsy with intravenous premedication and local analgesia, making possible reconstructive work in the dental office.

CEREBRAL PALSY SYMPTOMS: DESCRIPTION AND DEFINITIONS

There is some confusion about the terminology of the symptoms associated with neuromuscular disease. Part of this is due to a lack of understanding of the mechanisms involved, and part to the complexity of the nervous system which, in its high degree of interaction, is able to produce a seemingly infinite variety of manifestations in motor disease.

Spasticity, one such symptom, frequently is thought of as synonymous with cerebral palsy, but it may be a manifestation of any neuromuscular disease, depending on the type of injury. For instance, spasticity frequently is seen in multiple sclerosis, hemiplegia and incomplete paraplegia. To differentiate it from other closely related conditions, it must be remembered that spasticity is found in muscular weakness or paralysis, and is associated with hyperreflexia. Its main symptom is resistance to passive movement. Spasticity may be present in any single muscle, or group of muscles, including the facial muscles and especially the muscles involved in mastication (as in Case 1).

Passive motion is motion of an articulation brought about by external sources. Normally, there is no resistance to such movement. In spasticity, however, the muscle appears to "catch hold" and even contrary to the direction of the passive motion. If an attempt is made to open a spastic jaw, terrific resistance is met and, in fact, if attempts are made to force the mouth open, muscle contractions may clamp the jaw shut with terrific force.

Cerebral palsy patients may not have spasticity, but may have athetosis. This manifests itself in irregular, objectively purposeless movements which usually follow a definite pattern in each patient and frequently are accompanied by associated movements in other parts of the body. These are thought to be spontaneous, but frequently are initiated and aggravated by outside stimuli. Most important, from the dentist's point of view, they are made worse by attempts on the part of the patient to control them. There is a strong emotional component in their intensity. It is a common observation that the athetoid patient is at his worst in an emotionally charged environment such as the dental office.

Rigidity is another symptom which may be present in many types of neuromuscular disease. It may be a manifestation of spasticity, or it may result from hyperreflexia which occurs at the level of the spinal cord. Rigidity of the mouth and facial muscles most often is found exclusively in cerebral palsy. Rigidity is contraction which is maintained but which eventually relaxes through exhaustion or other factors. This is to be differentiated from contracture, which is a shortening of the range of motion. Contracture does not cease as does rigidity, since in contracture there is an actual shortening of the contractile and connective tissues. In Case 1 contractures were so severe as a result of spasm and rigidity of the right arm that they had to be corrected surgically.

PREMEDICATION TECHNIC

The patient is relaxed by premedication with barbiturate, staying short of hypnosis. Small doses of scopolamine and

meperidine are added following the same procedure as has been used previously with emotionally disturbed patients.[6-8]

Pentobarbital sodium, 50 to 200 mg., is first given intravenously, very slowly, until a state of fairly deep sedation is reached. In some instances spasticity is relieved at this point, and in athetoid patients the jerkiness is relieved, if not stopped. Further control is necessary. Instead of giving more barbiturate, which would cause hypnosis, a small amount, 20 to 75 mg. of meperidine mixed with 0.3 mg. of scopolamine and diluted to a total volume of 5 cc. with sterile water, is injected intravenously, very slowly. This seems to give the patient a feeling of comfort and adds to the already well-established relaxation. With this amount of medication, the effect of which is short of hypnosis, no noticeable respiratory or cardiovascular depression is noted, and it has been possible to proceed with reconstructive dental work anywhere in the mouth. Gold veneer crowns, porcelain jackets and fixed bridgework are accomplished without any more difficulty than with a normal patient.

It has been found that the quantities of medication required by a patient remain relatively constant, even over a period of time, except when home medication has been changed. For instance, in Case 1 the patient required 150 mg. pentobarbital sodium and 50 mg. meperidine together with 0.3 mg. scopolamine while taking 10 mg. of dextro amphetamine a day, but when she stopped taking the dextro amphetamine she was controlled with 90 mg. phenobarbital sodium, 40 mg. meperidine and 0.3 scopolamine.

NEUROPHYSIOLOGY

After injury to the central nervous system, there is a reversion to primitive patterns of motor behavior.[9] The particular manifestations are governed by the site and extent of the injury. Spasticity is one such symptom thought to result from the release of lower portions of the central nervous system from higher-level control.[10] The more the propriospinal network is isolated from the brain stem, the more complete is the spasticity, reaching a maximum in decerebrate rigidity when the headmost segment, the pontine reticulum, is separated from higher influence.

Magoun and Rhines[10] and Sherrington[11] have compared spasticity to decerebrate rigidity in the experimental animal. The decerebrate animal has an interesting pattern of responses to proprioceptive stimulation which, in essence, duplicate primitive postural or righting reflexes. In spasticity, the stretch reflex is the exaggerated reflex of prime importance.

Attempts to modify spasticity have been directed at modification of the exaggerated reflex. Foerster,[12] for example, sectioned posterior spinal roots conveying sensory stimuli from the affected extremity. Attempts at cutting facilitatory pathways have not been as successful because of the lack of precise knowledge of mechanisms involved, and because too many alternate pathways appear to facilitate spasticity.

Drugs such as mephenesin[13] have been employed with partial success. These are assumed to act on the internuncial neurones. Chlorpromazine injected intra-

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13. Libert, B., and Rubin, D. Mephenesin in treatment of spasticity in multiple sclerosis. J. Nerv. & Ment. Dis. 116:198 Sept. 1952.

venously is reported to have a definite but transient ameliorating effect on spasticity.[14]

Physical factors which modify the reflex arc also influence spasticity. These include locally applied heat and cold. Relaxation of spasticity after electrical stimulation of antagonist muscles has been reported.[15-17]

Athetosis is another symptom resulting from the release of lower centers from higher center control. Bucy[18] stated the belief that the involuntary movements of athetosis develop as a result of impulses which descend from suprasegmental centers to the anterior horn cells by neurons other than those of the pyramidal tract. These impulses are carried by parapyramidal fibers from areas four and six of the precentral cortex, which then terminate in various subcortical centers from which the impulses are carried downward by secondary neurons. Attempts to manage athetosis have been similar to those employed in spasticity: surgery, medication and physical therapy. Putnam[19] showed that sectioning of the anterior columns of the spinal cord, completely sparing the lateral pyramidal tract, would reduce or abolish the involuntary movements. Both Putnam and Bucy have expressed their belief that this procedure interrupts the parapyramidal system.

Reflex spasm and the related symptom of rigidity are manifestations of the most complete form of release of spinal centers from control by the supraspinal segments. Both of these symptoms are seen in the paraplegic with complete section of the cord. Control of these symptoms involves sectioning of motor or sensory nerves for permanent control, or dampening of sensory stimulation for temporary control.

The dentist's specific problem is temporary control of these various symptoms to permit easy management of dental reconstruction. As such, drug control appears to be the method of choice. Bucy and Case have shown that large doses of the barbiturates abolish involuntary movements for many hours after the individual has awakened from the sedative and after voluntary movements have returned. This implies the possibility of using a dose of the barbiturate which will abolish the involuntary movements but not the voluntary ones.

French, Verseano and Magoun[20] demonstrated that afferent impulses conducted medially in the brain stem were dampened by the pentobarbital anesthesia. Such dampening might explain in part the beneficial action of pentobarbital in both spasticity and athetosis.

The action of morphine and its derivatives on the nervous system has been studied by a large number of investigators. The experiments of Joel and Arndts[21] indicated participation of parts below the cortex in the morphine picture, but for narcotic action, parts of the nervous system above the medulla are essential. Blume[22] noted in the decapitated animal an initial dampening of reflexes followed by their exaggeration. Examination of the literature on morphine emphasizes that the difficulty in localizing the activity of morphine centers on its biphasic action; it may be either depressive or excitatory, depending on the time of action of the drug, and the dosage. Small doses may act one way,

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21. Joel, E., and Arndts, F. Contributions to pharmacology of posture and labryinth reflexes; morphin. Arch.f.d.ges.Phiol. 210:280 1925.

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larger ones in the opposite way.

Meperidine, a morphine derivative, is a depressant and sedative. The pain threshold is raised and the reaction of fear and apprehension accompanying pain is reduced. This is most valuable when there is emotional aggravation of the athetosis symptoms. If given alone, vomiting and gagging may result, but this is not present when pentobarbital sodium is given first.[23]

Scopolamine in small doses acts centrally as a cortical depressant, and yet it decreases the depression of meperidine while increasing the cardiac output and respiratory rate. Scopolamine and, to a lesser degree, meperidine, block the activity of the salivary and mucous glands and stop the drooling so characteristic of some patients with cerebral palsy. A completely dry field is established.

REPORTS OF CASES

Case 1—Spasticity and Rigidity • The patient, a woman, was age 36, and weighed 85 pounds. She was seen first two years ago in a wheel chair, completely helpless. Her arms, especially the right, were held in a slightly flexed position, and both legs were stretched out in a state of rigidity. She had a mixture of spasticity and rigidity. From childhood on, dental work had been done by pedodontists under general anesthesia, but the oral condition had reached the point where a major reconstructive procedure would be necessary because of rampant secondary caries involving all her teeth except the four lower incisors. Attempts had been made to have the work done by dentists in their offices, giving barbiturate premedication orally. But, even so, her spasticity was so severe that during oral examination her mouth clamped shut, crushing the mouth mirror so that she had to be taken to the hospital to have her throat and oral cavity cleared of glass splinters. Another attempt was made with oral premedication, but this also failed, and she slept for several days afterwards because of the great amount of the drug given her.

Pentobarbital sodium was given intravenously, slowly. After about 125 mg. had been given in the course of 10 minutes, the patient's arms began to relax and, after an additional 20 mg., she was able to open her mouth and it was possible to examine her teeth, although she still showed signs of anxiety. The syringe was detached from the needle and exchanged for one containing meperidine and scopolamine and, over a period of 15 minutes, 60 mg. of meperidine and 0.3 mg. scopolamine were injected. Careful watch was kept on respiration, pulse and blood pressure. A slight lowering of blood pressure was noted. The patient was taking 10 mg. of dextro amphetamine a day at home.

The patient was able now to open her mouth sufficiently so that it was possible to take a full set of roentgenograms. I also was able to make a careful clinical examination of her mouth and teeth including pulp testing. The patient was asked to wink her eye the moment she felt the electric current. She was completely cooperative at all times. At no time was there any tendency for the mouth to close by reflex action of the muscles. Diagnosis based on clinical examination and roentgenograms revealed extensive caries in the upper teeth and all the lower posterior teeth, the lower right cuspid included. All teeth were vital, no periodontal lesions were found, but the mouth was in poor hygienic condition.

The reconstructive work was done in 12 sittings without hardship or discomfort to the patient. Each sitting was for two or three hours. In one instance the needle slipped outside the vein and some, or most, of the solution was injected in-

23. Jorgensen, N. B. Control of nausea from meperidine (Demerol). J. South. California D. A. 23:32 April 1955.

travascularly, so that the relaxation necessary to proceed with any dental work was not obtained. It was not considered safe to supplement the extravascular injection with another intravenous injection since there was no definite way of knowing when the maximum effect of the extravascular injection occurred. Her mother reported later that extreme drowsiness occurred an hour after the patient arrived at home.

At each of the sittings, which were kept at least a week apart, exactly the same amount had to be given. Twice it was tried to reduce the amount of pentobarbital sodium or meperidine, but each time it was necessary to add to the premedication to bring it up to the amount determined at the first sitting. Dose requirements for the same person seem to remain standard when given this way, and no cumulative effect takes place. Even after the amount of premedication has been determined, each subsequent injection must be given slowly.

All the patient's teeth except the lower incisors needed reconstruction, most of them with full gold veneer crowns with or without plastic facings. Though the patient was awake and able to open and close her mouth when asked to, complete amnesia about the work done resulted from the premedication.

This same patient came in two years later to have a fractured lower incisor repaired. In the interim she had been in the hospital for neurosurgical correction on her arms and wrists to relieve the extreme muscle flexions which had become aggravated still further. During this surgical procedure the tooth had been fractured by the prop that was used to open her mouth.

Case 2—Athetosis • The patient, a woman, was age 36, and weighed 165 pounds. This patient suffered from the athetoid type of cerebral palsy. Her head would move violently at times. She was mentally alert and able to speak, though with difficulty. She had an unusually fine set of teeth, except for two upper bicuspids with extensive caries. She had been to an oral surgeon to have these removed under general anesthesia, but was referred to one of us (N.B.J.) to have the teeth repaired instead.

The same procedure was followed as in Case 1. This patient required 200 mg. of pentobarbital sodium, 100 mg. of meperidine and 0.3 mg. of scopolamine before she was calm and free from athetoid movements.

A full set of roentgenograms was taken with the long cone technic. The film was held in a hemostat and the patient held the rubber prop between her teeth. She was able to cooperate completely. Any attempt at cooperation before premedication would have resulted in aggravation of her uncontrolled movements.

At the second sitting, the same premedication was given, always slowly. All upper and lower molars with carious lesions were cleaned out and the teeth restored with alloy fillings. The pulp of one upper left bicuspid was exposed, and pulpotomy was performed under rubber dam. After the work had gone on for an hour and a half, the patient's head started jerking slightly, and an additional 50 mg. of pentobarbital sodium was given, after which she became completely calm and the work was finished.

It is understood, of course, that local anesthesia was used for pain control in each instance.

Case 3—Athetosis • A girl of 18 years, weighing 90 pounds, had severe athetosis. She was in a wheel chair with body and legs immobilized by appliances. The neck and head, however, were in constant movement.

After premedication with 25 mg. of pentobarbital sodium intravenously, roentgenograms were taken which revealed carious lesions in the occlusal surfaces of all her posterior teeth but no interproximal caries. Her systolic blood

pressure was 82 mm. mercury. The diastolic pressure was difficult to determine, but was about 50 mm. mercury. Because of this low pressure, premedication was given cautiously and slowly, and a constant check on the blood pressure and respiration was maintained. When 50 mg. of pentobarbital sodium had been administered over a period of 10 minutes, her uncontrolled reflexes quieted, or disappeared, and two inferior alveolar injections were given using 0.5 cc. of a local anesthetic in each side. Two upper zygomatic injections of the same amount were used. Eight occlusal cavities were prepared without any difficulties. The blood pressure did not fall, and it was not found necessary to add meperidine to establish the desired relaxation. This patient for six years had taken orally 0.5 Gm. a day of Mephobarbital. It is of interest that under the circumstances 50 mg. of pentobarbital sodium given intravenously had such a profound effect.

Case 4—Facial Athetosis • The patient, a 30 year old man weighing 110 pounds, had athetoid symptoms with ataxia of the muscles of articulation and facial muscles of expression. While the head and arms moved more or less regularly, the jaw snapped together with a loud noise and then opened again.

Roentgenograms were obtained with difficulty 20 minutes after 2.0 Gm. of mephenesin had been administered by mouth in elixir. Several occlusal cavities were discovered. At the second sitting 25 mg. of pentobarbital sodium, 75 mg. of meperidine and 0.3 mg. of scopolamine was administered intravenously which resulted in light sedation only. It was with some difficulty that any operative work could be done, as his jaw still would snap shut occasionally.

This case is included to illustrate partial success due to inadequate sedation. A larger dose of pentobarbital sodium and less meperidine should have been employed.

At the next sitting this patient was given 100 mg. of pentobarbital sodium, 25 mg. of meperidine and 0.3 mg. of scopolamine. There was still some tendency toward spontaneous closure of the jaw, but it was not such as to interfere with operative procedures.

Case 5—Spasticity and Athetosis • The patient was a 30 year old man who weighed 120 pounds. He had the athetoid type of cerebral palsy. His oral condition generally was good, but the enamel of the lingual surfaces of his upper two central incisors had been completely abraded from the use of metal "straws" when eating, this being the only possible mode of taking nourishment.

Reconstruction with gold veneer cast crowns, with plastic facings baked in, was decided on.

At the next sitting he was given 150 mg. of pentobarbital sodium, and 50 mg. of meperidine with 0.3 mg. of scopolamine. Supraperiosteal injections with local anesthetic were given. The patient was now completely relaxed and in deep sedation; his gagging reflexes, which became activated whenever his mouth was opened, were now conquered completely, and the veneer preparations were accomplished without any difficulties. His normal protective throat reflexes, however, were functioning, so that whenever sprays of water got back in his throat, he would cough and spit out the water. For about five minutes he was close to hypnosis but, otherwise, during the entire working time he was awake and appeared happy.

In this patient the systolic blood pressure was lowered from 110 mm. mercury to 105 mm. mercury so that heavy sedation did not result in any depression of consequence of the vital centers.

SUMMARY

There is a need for providing optimal dental care for a large number of adults

afflicted with cerebral palsy. The problem is overcoming the motor symptoms without the inconvenience of general anesthesia.

A technic for quantitative intravenous premedication to prepare even the adult patient with spasticity for dental work has been outlined. Pentobarbital, meperidine and scopolamine were employed.

Five cases illustrating the effectiveness of this procedure in adult cerebral palsy are reported.

The problems presented by the patients described in this study, and the measures used to solve them, indicate several worthwhile procedures that may be used effectively in the dental management of patients with cerebral palsy.

Journal Publication in Microform • Communication is the blood stream of science. So emphatically is this the case that it may truthfully be said that science did not become an identifiable human activity until arrangements for communication between scientists were effected. Among these arrangements, publication has always taken a place of principal interest. Yet publication, so auxiliary though so necessary to the progress of science, has continuously presented scientists with one of their principal problems. There is either too little of it, or too much; it is too ubiquitous or too inaccessible; it is too deficient in detail or too plethoric. Above all, it suffers from delays and expense which greatly reduce its potential effectiveness. Science has continuously sought for media and methods of publication which would speed up communication, reduce cost and volume, and—by narrowing a field of interest—both reduce the total quantity of material to be read and at the same time permit greater detail in that which remains to be read. Microphotography has long seemed to offer possibilities for these purposes. Almost a hundred years ago, it was successfully applied by the photographer René Prudent Patrice Dagron to the carrier pigeon post which linked Paris to the outside world during the siege of 1870; in similar fashion, it was adapted to the V-mail of the last war. Several scientific groups are now looking at the possibilities of journal publication in microform. Their experience will be awaited with interest by all who are concerned with the problem of scientific communication. *Verner Clapp, Science 127:1145 May 16, 1958.*

Factors affecting group practice

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From the beginning of time men have banded together to provide better the necessities of life and to protect and promote the general welfare. In this manner the clan, the tribe, the nation and groups of nations have allied for mutual benefits that could not be obtained by acting individually. Expressions such as "United we stand, divided we fall," "In union there is strength," or the negative expressed in the familiar "divide and conquer," all emphasize the fact that a group of individuals acting together presents a more substantial and impregnable front.

Because of the complexity of modern professional training and the myriad problems attendant to the practice of medicine and dentistry, these principles can and have been applied, and the result is group practice: a group of individuals banded together for mutual benefit. A group practice is not a clinic, as a clinic denotes either a group of pure specialists or an office wherein service is done for indigents without charge. The dental group is neither. It is a group of general practitioners and some specialists who operate an office together to do high quality dentistry at regular fees. According to the *Principles of Ethics* of the American Dental Association:

> Group practice is that type of dental practice in which ethical, licensed dentists, sometimes in association with members of other health professions, agree formally between themselves on certain central arrangements designed to advance the economical and efficient conduct of a dental practice in order to render an improved health service to the patient.

In the group, as the author sees it, each member retains his own identity, there is no superior or commander, and each must work for the good of the whole.

ADVANTAGES OF GROUP PRACTICE

The advantages derived from a group association are so many and so rewarding that it seems proper here to elucidate. Perhaps the greatest items in favor of group associations are to be found in intangible assets such as the lack of concern when one dentist wishes to take an ordinary vacation. There is no need for special planning for vacation help, patients' care during one dentist's absence, telephone answering service, and so forth, nor is an associate faced with the overhead problem of an office costing basically as much while idle as during production. The group continues to function, all facets of practice continue, and monetary loss and concern for the practice is cut to a negligible item.

Illness or accidental injury is a factor which causes extreme concern to the individual practitioner, but in a group this problem too is minimized. There is usually some arrangement in a group agreement for some compensation to a disabled confrere, and his practice is held together and protected during his absence.

A similar advantage is found if one

of the members of the group is called to military duty. Undesirable and expensive problems such as taking care of equipment storage, office space, lease agreements and valued personnel are mitigated until almost painless. These advantages, as stated before, are intangible, yet over a period of years represent a tangible saving in dollars and cents.

The professional advantages of group associations are perhaps the most rewarding of any, and take form in some unsuspected ways. Whenever two or more men are associated, the old adage of "two heads are better than one" becomes ever so true. Consultation is easy and almost constant and, through this consultation, new ideas, new technics and new approaches are found to common dental problems. These consultations may be planned or spontaneous, but out of this sharing of experience and ideas, better dentists emerge and certainly an improved patient service is rendered. This means that the dentist is a better dentist, and the patient a like beneficiary.

The group association is a potent factor in raising the standard of dentistry provided by each of its members. The usual situation in which a dentist sets himself up in an office after graduation and begins to practice dentistry as he was taught, surrounding himself with employees who exude confidence in him and his ability, is very dangerous to his progress. No one is ever allowed to question him in his ivory tower. He is "king" and this has led all too often to a gradual decline in the type of dentistry accomplished, for there is no one who sees his work from day to day who is qualified to criticize or suggest correction. This cannot happen in a group. With many professional eyes observing and critical associates to please, the individual constantly is taking a postgraduate refresher course, and out of these experiences better operators are developed and professional standards raised. It can be likened to the medical practitioners' experience in the hospitals where their work is scrutinized and they can scrutinize the work of their fellow practitioners.

Perhaps the most overrated advantage in the group associations is the thought that great savings are achieved by the group purchasing power. There are some advantages it is true but, by and large, the savings on standard dental items are quite small. Selective purchasing of some items does represent a major saving; one x-ray machine will serve quite a number of dentists, and other equipment that is also necessary but seldom used represents a definite saving and consequent lowering of overhead, but the advantages here have been distorted beyond proper proportion.

One of the most outstanding assets of the group is the ability, because of volume, to have specialists in key positions in the office management level. By this is meant a trained office manager or financial secretary, a bookkeeper who does nothing but keep accounts accurate and current, trained appointment secretaries who lay out a productive day and guard zealously the doctors' valuable time, a trained x-ray technician, and so forth. Here efficiency and proficiency combine to make the doctors' day a better, easier and more profitable one and prevent the wasting of valuable time.

In speaking of the advantages of having specialists in key positions the dental laboratory must be mentioned. In a large group there is enough volume to have a number of technicians whose skills and training qualify them as specialists in their laboratory specialty. It is possible to have one particularly trained for denture prosthesis, one for partial dentures, one for bridgework, and so forth. This is not the only advantage concerning the laboratory, for the close association of technicians and dentists makes for easier guidance to design and finish, and a finer end product for the patient.

The group is an optimum method of practice. It has the afore-mentioned ad-

vantages, which also result in many advantages to the patient, not the least of which is the fact that more people can be handled better. Never is a patient turned away because of an overcrowded schedule. In group associations there is always some one who can see an emergency. A small filling, an aching tooth, a broken denture present no problem in the group. Many men with interests in varying fields and with training by different methods and different teachers are at hand to help solve quickly diagnostic problems that might be otherwise long and tedious.

Another item of interest is the fact that the group brings many people to one specific building for dental care. This provides a broader patient base and certainly helps to insure a continuation of profitable practice even if the time should come again when money for service is not as easy to come by as it has been the past 15 years. Many patients get into the habit of visiting an office in a certain building and even though the dentist leaves, the patient remains to become a patient in another practice in the same building. This is strange but true, and it may be because the patient has adopted the place as his or her dental home and does not like to move.

In order to maintain an efficient organization it is necessary to have regular meetings of the principals involved, and periodic meetings of all personnel. These staff meetings usually are to discuss any knotty problems that come up, or to formulate policy, or for discussion of problem cases. The meetings usually are short, not to exceed a half hour, but they should be held every week to keep everyone abreast of any problems or policy changes.

PROBLEMS IN GROUP PRACTICE

Group practice presents some problems that are not common in the general practice of dentistry. One of the most complex is the problem of compensation for the members of the group. There are various ways to provide proper and adequate compensation, but the author believes that the practice of using a formula, whereby the different production capabilities of each dentist are recognized, and basic percentage plus a percentage increase at various levels of production is used for all members is the fairest. This method stimulates each operator to promote his own production. It is a definite incentive because as he reaches certain levels of production the returns become greater to him in relation to the group as a whole. This formula must be more or less individually established in given areas under recognized conditions, and the help of an accountant is needed.

The undivided sharing of income equally has many drawbacks and unfavorable aspects, for it suffocates incentive and does not recognize the important factor that dentists operate at different tempos and with varying degrees of efficiency no matter how similar their training and experience. Equal sharing of profits is, therefore, to the advantage of the slower, less efficient operator and at the expense of the more efficient and better producer.

Compensation of personnel and the problem of getting people to work together has some unique features in the group practice. It is necessary to classify job categories more accurately and to realize that the compensation must remain within proper limits for these job categories or there will be dissension. The larger the office the more like a civil service classification the positions become. By the same token, as the demand for a larger staff is indicated, the ability to work with other people in harmony becomes an increasingly important factor in interviewing prospective applicants.

There are some factors of practice in a group that may detract from the overall advantages obtained. In some in-

stances individualism must be submerged for the good of the group as a whole. The ability to do this depends, to a great extent, on the harmony of the group practice. Then too, it must be realized that each member of the group is responsible for and judged by the actions of every other member and must conduct himself accordingly.

In addition to the facts mentioned it must be realized also that large group practices, although growing in importance in this country, are still not readily accepted by the rank and file of the profession and, for some reason, are looked on with some misgivings and reservations.

Group practice should not degenerate into an automat into which people are fed on a conveyor and emerge ground, filled, incised, sutured and irradiated. When this happens, professional ethical and moral standards all will suffer, and the result will be detrimental to the patient. The group as a close knit cooperative unit can surely mean efficient, high quality dental service for more people.

To summarize, the group presents the following advantages but not necessarily in the following order: (1) worry-free, expense-free vacations; (2) sickness and accident protection; (3) constant consultation; (4) constant refresher courses through helpful suggestions; (5) economy of operation; (6) efficiency of key personnel; (7) broader patient protection and (8) more convenient patient care.

"In unity there is strength" is as true in the professions as elsewhere.

1964 Fourth Avenue

Dental Ethics • Ethical practitioners in the dental profession—and they are in the majority by far and deserve the law's broadest smile of approval and maximum support and protection—are quick to deplore these illegal practices and hold that in addition to all else they violate the tenets of their profession. More is expected of them, however. Only through vigilant and accredited dental organizations can such practices be stopped. As with accredited organizations in all professions, a dental society is in the best position to know in what manner and to what extent violations of professional standards take place. In this respect, history has revealed repeatedly that the degree of successful law enforcement has a direct bearing upon the overt, substantial and genuinely enthusiastic support received from such professional organizations. To do less is to incur public distrust. No substitute exists.

Whatever difference of opinion may exist between members of the dental profession in respect of the extent of the functions of dental mechanics, let there be no mistake about this: The law—both civil and criminal—does not countenance the slightest invasion by either or both upon the fullest protection to which the public is guaranteed. Professional care means exactly that; the law tolerates nothing less.—*Cited from the decision of Judge Charles Penningroth of the District Court of Iowa in the case of the Commissioner of Public Health of the State of Iowa vs. Gilbert J. Thoren, Public Dental Laboratory. (p 11).*

DECEMBER 1958

LON W. MORREY, D.D.S., EDITOR
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THE Journal OF THE AMERICAN DENTAL ASSOCIATION

Editorials

History of the American Dental Association soon to be off the press

The American Dental Association is about to observe its one hundredth anniversary. Last month, in Dallas, the Association held its ninety-ninth annual session. Slightly more than a month hence, it enters its one hundredth year. A national organization—particularly a growing, active organization—makes an amazing amount of history in a hundred years. Unfortunately, many organizations—and the Association is among them—are so busy making history that they neglect to record it in a comprehensible manner. To go back through the years, by way of dusty archives, to pick up and piece together seemingly unrelated items and weave them into a related whole is no minor accomplishment. The Association, however, has done so—rather it has had it done by an accomplished historian on the faculty at Loyola University of Chicago.

Robert W. McCluggage, Ph.D., begins his history of the American Dental Association with the confession that until five years ago he had little appreciation of dentistry. Since childhood he had regarded it as a necessity which had to be endured to be acceptable in polite society. Dentistry was a current annoyance with no past and less future. When historian McCluggage later became interested in this subject, he recognized that it had not been sufficiently borne in on him that the American Dental Association and the profession which it represents are highly respected entities, and that neither could have reached its present place in society without having traversed a long, hard, uphill path. A little research soon disclosed that along

that path the Association had encountered and solved many problems—often unrelated and often officially unrecorded. He came to the conclusion that it should be possible to tie these separate encounters into a cohesive whole, not by compiling a colorless chronological account, but by uniting them with a guiding thread representing the ambitions and objectives of a dedicated health organization.

It was with this belief that Dr. McCluggage undertook to write the history of the American Dental Association. He wished to satisfy himself and to set forth, as clearly as possible, causes and effects. It is in this spirit that his history is written. Dr. McCluggage's work is original in the sense that it is an independent critique of the Association's commissions and omissions, its deeds and misdeeds, its weakness and strength, and its contributions to American society during its first one hundred years of life.

In four hundred pages of illustrated text, the historian recounts the genesis, development, activities and accomplishments of a great professional organization. His is not a dry statistical tome but a lively record of a live organization. He interprets the facts of the Association's life against a backdrop of a century of American progress, and in so doing he shows in operation the many and varied forces which have made for the progress of the dental profession.

Dr. McCluggage's history of the American Dental Association which is to be off the press early in 1959—the Association's centennial year—is designed for those who take pride in the progress of dentistry and in the part played therein by the American Dental Association. It is a record of a proud and respected heritage—a book worthy of a prominent place on the bookshelves of every dentist.

The Journal of Oral Surgery increases its usefulness by becoming the Journal of Oral Surgery, Anesthesia and Hospital Dental Service

The growing realization that total health care requires dental service as well as medical and surgical service is rapidly bringing about a closer relationship between hospital administration, dental society administrators and general practitioners of both dentistry and medicine. The time is rapidly approaching when modern general hospitals will be equipped with facilities and personnel to provide necessary dental service to all its patients, including those in its outpatient department. No longer will dental service be limited, as it has in the past, to oral surgical procedures.

From the patient's standpoint, two very important steps have recently been taken which have helped bring about this closer relationship. A third step is about to be taken. In each of the past two years a workshop on hospital dental service was conducted under the joint auspices of the American Hospital Association and the American Dental Association. The findings and conclusions of the workshop participants and many of the workshop papers were published in both the JOURNAL OF ORAL SURGERY and the JOURNAL OF THE AMERICAN HOSPITAL ASSOCIATION bringing to the readers of each a better understanding of their mutual dental service problems.

The third constructive step will be taken on January first. It consists of the renaming and broadening of the perspective of the JOURNAL OF ORAL SURGERY. Beginning with the January 1959 issue, this bimonthly magazine which, since its inception, has been devoted exclusively to oral surgery subjects, will be published as the JOURNAL OF ORAL SURGERY, ANESTHESIA AND HOSPITAL DENTAL SERVICE. This important and farsighted change was decided upon by the Board of Trustees of the Association in order to provide an official outlet for the rapidly growing number of reports and articles appearing on the broad subject of hospital dental service. As Fred A. Henny, editor of the soon-to-become JOURNAL OF ORAL SURGERY, ANESTHESIA AND HOSPITAL DENTAL SERVICE, comments in its January issue, the change in name has been made "to allow inclusion of a broader field of hospital dentistry in title as well as in fact. . . . We are hopeful that our new journal will stimulate interest in hospital dentistry and broaden our profession's effectiveness in hospitals of the future."

Please care—hunger hurts

This is the season of the year when it is customary to think of others. It is the season of the year when gifts and greetings are sent to friends and neighbors.

It is the season of giving.

Americans, privileged to live in a land of abundance, observe the Christmas custom of giving—even to the extent, at times, of giving too lavishly.

Although it would be inappropriate to suggest that we fail to remember our immediate neighbors this Christmas, it is not inappropriate to suggest that we also have neighbors in less prosperous corners of the world—neighbors with barely sufficient food to sustain them; youngsters with little but rags to clothe them; oldsters with scarcely a roof for shelter.

It is suggested that each of us this year widen our Christmas gift list by including at least one inexpensive gift to our less fortunate neighbors. It can be done easily and without disturbing our Christmas budget by simply giving a wee bit less lavishly at home—by deducting one or more dollars from the over-all costs of the usual holiday gifts and sending the donation to CARE.

Every dollar donated covers CARE's costs of packaging and distributing one Food Crusade package to the needy in critical areas in Asia, Europe, Latin America and the Middle East. A typical package, consisting of United States surplus foods, weighs 22 pounds. It contains five pounds of flour, five pounds of milk powder, five pounds of corn meal and seven pounds of cheese. Each package helps feed at least four persons every day for a month.

Hungry children and their parents who otherwise would never get enough to eat receive this food as your personal gift. Your name and your address go with each package your dollar provides to tell those who receive it that you and your country are their friends.

What better gift could be given at this season of the year than a CARE package to the needy. It is so simple, so inexpensive, so humanitarian and so helpful to international relations. All dentists are invited to join the CARE program. Simply send a check for one or more dollars to CARE, 189 Madison Street, Chicago, or to your local CARE office.

International Correspondence

NEWS FROM GREAT BRITAIN

NATIONAL HEALTH SERVICE

In an editorial in the *British Dental Journal*, August 19, entitled "The Next Ten Years," the following appears:

"On July 30 the House of Commons held a six-hour debate on the first ten years of the Health Service. The debate covered a wide field and it was not possible for any one subject to be dealt with in detail, perhaps because some of the speakers were concerned more with party politics than health.

"When the principles of the Health Service were under discussion before the Act was passed, the dental profession urged that the first provision should be for children and adolescents and that a full service should be built on that in the light of experience. The government of the day would have none of this and adopted what proved to be two incompatible slogans; a comprehensive free service, and priority treatment for children and nursing mothers.

"There is no party, and no Minister, who should not wince at the mention of priority. It has been a catch phrase from first to last, with no meaning and no evidence of intended implementation by any who have used it.

"During this wayward discussion, apart from a reference by the Minister of Health to the possibilities of fluoridation, one of the few contributions of any real value to the future health of the country was made by Mr. William Shepherd, the member for Cheadle, who said 'Better than all the doctors and all the research organizations would be to persuade people to eat and drink intelligently. How many people kill themselves by their methods of eating and by the things they eat? A great number; in fact, many more than those who kill themselves by what they drink. Health can be achieved to a remarkable degree by caring for what we eat and drink. In far too many homes today, even when there are considerable sums of money coming into the household, the fish and chip mentality still prevails. So there is an urgent need to teach people what they ought to eat. If we can do so, far fewer doctors will be needed than are needed at the present time.'

"This is what members of the dental profession have been saying all this century, what the Dental Board and the General Dental Council have constantly endeavoured to teach, and what the McNair Committee had in mind when it said 'a comprehensive national program of dental health education is, therefore, an essential . . .'

"The next ten years of the Health Service will be judged more stringently than the first ten, which may be considered fairly to be an experimental stage. The aim of such a service should not be more and more bottles of medicine, boxes of pills, and fillings in carious cavities, but a steady improvement in positive health."

PARLIAMENT

In the debate on the first ten years of the National Health Service, Mr. John Baird made some pertinent remarks. He said:

"I am wondering whether something cannot be done to divide up the work between the school dental service and the dental practitioners. I suggest that if we cannot get enough dentists into the school dental service we should use that service as an inspection service where the dentist would inspect the children's teeth, find out what treatment was needed, advise the parents to this effect and then send the children to a dentist inside the general dental service. That, I think, is a compromise which might work quite efficiently.

"The different conditions under which dentists work in different local authorities lead to all sorts of trouble and chaos. The time has now come when we should have a national dental service in which dentists should work directly under the Minister of Health. I think that if we are to get an efficient dental service that is the only way in which we shall ever get it. It cannot be done immediately, but the Ministry of Health should be looking into the problem now."

Mr. Baird turned to the subject of fluoridation and urged that the Ministry of Health should either "counteract the kind of propaganda that is being put out in Andover or, more sensibly, accept the evidence coming from Slough, South Shields and the U.S.A. and go ahead with a national scheme now."

EXPANSION OF DENTAL SCHOOLS

The Minister of Health made the following statement:

"After full consultation with the University Grants Committee the Secretary of State and I have accepted the recommendation in the Report of Lord McNair's Committee on Recruitment to the Dental Profession to the effect that the annual output of dental schools in Great Britain needs to be expanded to produce at least 800 dentists who will practice in this country. This means that the capacity of dental schools in Great Britain will have to be expanded from the present potential intake of about 650 students per annum in their first professional year to a number larger than 800 since we must also allow for wastage and students from overseas not intending to practice in this country. The allowances for these two factors must be decided in the light of up-to-date experience; but present trends point to the need for planning for somewhat more than 900 students. We aim to start expansion as soon as possible; and, when considering projects for inclusion in the Government's program for major hospital building schemes, we shall give due regard, in consultation with the University Grants Committee, to proposals which will contribute to it."

DENTAL EDUCATION

The September 2 issue of the *British Dental Journal* is the annual education number and is well worth reading. There is an original communication on the teaching of prosthetic dentistry by Professor E. Matthe vs and an educational supplement which includes "A Directory of the Dental Schools and Examining Bodies," "Dominion Qualifications," a history of those qualifications recognized by the General Medical Council for Admission to the Dentists Register, and "Higher Dental Degrees and Diplomas." Finally there is a description of the function of the dental postgraduate bureau of the General Dental Counci' and details of the postgraduate instruction available at the Institute of Dental Surgery, Eastman Dental Hospital.

ITEMS OF INTEREST

Standardization of Anesthetic Equipment • Efforts toward the Anglo-American standardization of anesthetic equipment are expected to result from a series of meetings between anesthetists and manufacturers of anesthetic equipment, from both sides of the Atlantic, held in July at the British Standards Institution, London. Keen interest was shown in the promotion of effective cooperation in order to unify national standards, and the possibilities of international standards may be considered as a natural development. Subjects for discussion included connectors for breathing attachments for anesthetic apparatus, endotracheal tubes, anesthetic airways and resuscitation equipment.

Royal College of Surgeons • As the result of a recent ballot, Sir Wilfred Fish, president of the General Dental Council, has been re-elected to the office of Dean of the Faculty of Dental Surgery for the ensuing year. Professor T. Talmage Read of the Leeds Dental School was elected Vice-Dean.

David B. Scott, from the National Institute of Dental Research, Bethesda, U.S.A., gave a most interesting lecture on "Electron Microscopic Studies of Developing and Mature Dental Tissues" at the Eastman Dental Hospital. Such lectures from our colleagues from the United States are very much appreciated.

This being the December letter I take this opportunity to wish all my colleagues in the United States a good Christmas and a Happy New Year.

G. H. Leatherman,
D.M.D., F.D.S.,
R.C.S., F.A.C.D.

PERCY T. PHILLIPS INSTALLED AS PRESIDENT; PAUL H. JESERICH CHOSEN PRESIDENT-ELECT; FIVE TRUSTEES ARE NAMED TO BOARD

Percy T. Phillips, of New York City, a general practitioner, was installed as president of the American Dental Association at the closing session of the 99th annual meeting, November 10-13, in the Statler Hilton Hotel, Dallas, Texas. Dr. Phillips is the first native New Yorker to occupy the post of president. The House of Delegates elected as president-elect Paul H. Jeserich, dean, University of Michigan School of Dentistry, Ann Arbor, and retiring Trustee from the Association's Ninth District. Dr. Jeserich won over C. S. Renouard, Butte, Mont.

Elected by acclamation were the following candidates: First vice-president, P. Earle Williams, Dallas, chairman of the General Committee on Local Arrangements; second vice-president, James E. John, Roanoke, Va.; third vice-president, Walter E. Dundon, Chicago, and speaker of the House, Gerald D. Timmons, Philadelphia, dean of Temple University School of Dentistry. Dr. Timmons was elected to his fourth term as speaker.

Elected to the Board of Trustees were four members for three-year terms: First District, Arthur W. Easton, Norway, Me., succeeding himself; Sixth District, E. Jeff Justis, Memphis, Tenn., succeeding Arthur F. Schopper, Kansas City, Mo.; Seventh District, Maynard K. Hine, Indianapolis, succeeding Earl G. Jones, Columbus, Ohio, and Tenth District, Henry M. Willits, Dubuque, Iowa, succeeding Lewis W. Thom, Minneapolis.

A fifth Trustee, Raymond A. Hart, Saginaw, Mich., was appointed by President Phillips to serve out the unexpired term of Dr. Jeserich as Trustee of the Ninth District.

The House, displaying substantial agreement on all major issues, worked through a formidable agenda to establish guideposts for the Association as it closes out its first century.

With 410 of its 416 members present, the House:

Approved the plans of the Board of Trustees for the 1959 Centennial celebration, for the establishment of a Bureau of Membership Records, for reorganization of the constituent society of Puerto Rico as the Puerto Rico Dental Association, and for exchange of dental missions with the Soviet Union;

Received a report of the Board of Trustees recommending that the dues of active members be increased ten dollars annually, beginning January 1, 1960, by amending the Bylaws at the 1959 annual session, and laid the report on the table in accordance with the Bylaws, for action in the 1959 session;

Approved extensive changes in the Constitution and Bylaws, the amendments first having been considered and approved at the 1957 session;

Directed the appropriate agencies of the Association to cooperate with the federal agencies concerned to elevate the classifications of auxiliary dental personnel under civil service with definitions that are consistent with the philosophy and policies of the Association;

Approved reimposition for one year of the moratorium on the development of new specialty boards;

Sent greetings to the National Bureau of Standards on the completion of 30 years of cooperation between the Association and the Bureau;

Approved in principle a plan sponsored by Senator Lister Hill and Representative John E. Fogarty to establish a National Institute for International

Health Research within the National Institutes of Health;

Urged an intensified dental health education program to eliminate the false and misleading advertising of dentifrices;

Approved an alternate proposal of the Board of Trustees that a federation of constituent society auxiliaries be entitled to use the name "Women's Auxiliary to the American Dental Association," with the wives of all members in good standing and the widows of deceased members who were in good standing in the American Dental Association eligible to membership;

Resolved that, "until the legal rights and obligations involved in an accreditation program are settled, the Council on Dental Trade and Laboratory Relations be instructed to defer (1) the implementation of the 'Principles for Guidance of Constituent Societies in Formulating and Administering Programs for Accrediting or Approving Dental Laboratories' and (2) joint conferences with the National Association of Dental Laboratories on the need to develop a national-level dental laboratory accreditation program";

Directed the aforementioned Council to study and evaluate present Association policy opposing the adoption by state legislatures of licensure and registration measures for dental laboratories and dental laboratory technicians and report its findings to the House in 1959, and asked that, in the interim, no additional legislation be introduced or supported by constituent dental societies that would require the registration or the licensure of dental laboratories or dental technicians;

Directed the Council on Legislation to seek the enactment of legislation designed to amend the Dependents' Medical Care Act by removing the Territory of Hawaii from the category of geographical area in which dependents of military personnel are unqualifiedly entitled by statute to receive care in military dental facilities;

Amended the Association's policy statement on military dependent care by stating that "Dependents scheduled to go overseas under military sponsorship should be required to bring their dental conditions to a state of maintenance";

Asked constituent societies to urge their committees on hospital dental service to conduct a meeting on the subject at the societies' annual sessions;

Resolved that the Association would continue its membership in the American Thrift Assembly (which is supporting the Jenkins-Keogh bill) until the 1959 annual session;

Requested the Council on Legislation, in consultation with the Council on Federal Dental Services, to prepare a draft of legislation to correct inadequacies in the Army and Air Force dental services, and to introduce such legislation in the 86th session of Congress unless there is evidence that such legislation has no chance of passage, the Council to report on this matter at the 1959 spring session of the Board of Trustees;

Rejected a proposal of the Ohio State Dental Association that the American Dental Association's Relief Fund annual seal campaign be discontinued and replaced by a one dollar relief assessment of members of component societies;

Requested the Board of Trustees to consider amendment of the Bylaws to provide for separate scientific and business sessions each year, to give dentists the opportunity to attend both sessions;

Directed Association agencies to confer with officials of life insurance organizations to ascertain the feasibility of including dental examinations by a member of the dental profession for applicants for life insurance;

Instructed the Council on Dental Health, in its consideration of programs for meeting the costs of dental care, to include provisions which would enable the patient to secure the type of dental care of his own choice by extending his

Percy T. Phillips
President

Arthur W. Easton
First District Trustee

Maynard K. Hine
Seventh District Trustee

Paul H. Jeserich
President-Elect

E. Jeff Justis
Sixth District Trustee

Henry M. Willits
Tenth District Trustee

personal payments under a "table of allowances";

Resolved that the Councils of the Association continue to function with five members each until the results of the survey initiated by the Board of Trustees are reported to the House of Delegates at the 1959 annual session, rejecting proposals that membership on five-man Councils be increased to seven or to nine members.

FEDERAL DENTAL SERVICES

One of two lengthy debates in the House occurred over a joint report on federal dental services, prepared by the Councils on Dental Health, Federal Dental Services, and Legislation, and by the Bureau of Economic Research and Statistics. The report included a statement of specifications for a dental care program for dependents of personnel in the uniformed services, as amended by the reference committee, and a statement on the relation of dependents' dental care program to primary mission of the uniformed dental services. Both statements were recommitted to the three Councils and the Bureau for further study and report to the House at the 1959 annual session.

Also debated and amended was a report of the reference committee on legislation and judicial procedures. The report, a policy statement for application to the Forand bill and similar measures, attempted to consolidate the Association's past policies, in which the Association had recognized that the federal government might justifiably provide health care to persons to whom the federal government had a special responsibility, including the following categories, among others:

"(c) Persons employed in nonmilitary governmental service, should the federal government decide to purchase health care benefits from private sources as part of the employment contract.

"(d) Dependents of persons in military and other government service, should the federal government decide to purchase family health care benefits from private sources as part of its employment contract."

The report had further proposed that "the growth of private health care plans should be encouraged by all groups, including the federal government."

A substitute resolution, introduced by William McGill Burns, a delegate from Brooklyn, N.Y., proposed that the aforementioned sections (c) and (d) be deleted and the concluding proposal be amended to read that "the growth of voluntary private health care plans should be encouraged by all groups." Inclusion of the federal government in the above groups was thus to be deleted. Several delegates expressed fears that the Council on Legislation's proposed policy statement on the Forand bill would tend to encourage government control of health services. The substitute resolution by Dr. Burns carried on a standing vote, 206 to 158.

Subsequently, a resolution introduced by the Virginia State Dental Association, opposing the Council on Legislation's policy statement on the Forand bill, and proposing that the House rescind its policy statement of 1954 recognizing the right of Congress to consider the provision of health services for military dependents as an indirect form of compensating certain categories of military personnel, was postponed indefinitely, in accordance with the recommendation of the reference committee.

OTHER ACTIONS

The House conferred honorary membership on Senator Lister Hill, the senior senator from the State of Alabama, for his leading part in obtaining funds for the construction of the National Institute of Dental Research building, for his support of all efforts to improve dental

health and research, and for his contributions to the health of the American people.

The House elected as associate members Gunnar Ryge, professor and director of the department of dental materials at the Marquette University School of Dentistry, Milwaukee, and Mr. Everett L. Hoskins, president of the manufacturers' section of the American Dental Trade Association and chairman of the board of Cook-Waite Laboratories.

Seven hundred and fifty members were elected to life membership in the Association, each having completed 35 years of membership.

The Board observed that the total membership of the Association was 90,941 as of August 31, 1958, as compared to the total membership of 89,345 at the end of 1957.

GREETINGS RECEIVED FROM PRESIDENT EISENHOWER

Greetings to the American Dental Association from President Dwight D. Eisenhower were received. Addressed to President Alstadt, the White House message read:

"To those assembled for the 99th annual session of the American Dental Association, I send greetings.

"On this occasion, marking the threshold of your Association's 100th anniversary, you can proudly review your part in the expansion of dental education and research facilities, the many advances in clinical techniques, and the widespread adoption of water fluoridation as a public health measure. The new building of the National Institute of Dental Research authorized by the Congress with your support will symbolize both these achievements and the bright future of American dentistry.

"Best wishes for a stimulating convention and a most successful centennial year."

OTHER BOARD ACTIONS

The Board of Trustees met prior to and following the meetings of the House of Delegates. Among actions of the old Board, announced at the opening session of the House, were the reappointments, for another year, of H. B. Washburn, St. Paul, as treasurer; Harold Hillenbrand, Chicago, as secretary, and Lon W. Morrey, Chicago, as editor. The Board observed that Dr. Morrey on October 16, 1958, had completed 25 years of service to the Association, and praised his devoted services and his contributions to the Association and the dental profession. Members of the House joined in the applause.

The Board announced that on January 1, 1959, C. Willard Camalier would assume full-time duties as director of the Washington office of the Association.

The Board reported that it had designated Miami Beach as the site for the 1962 annual session, with dates of October 29-November 1, and Atlantic City as the site for the 1963 annual session, with dates of October 14-17.

The Board acknowledged with appreciation the six years of service of the following Council members who completed their terms this year: Paul C. Kitchin, Council on Dental Therapeutics; Walter E. Dundon, Council on Dental Trade and Laboratory Relations; H. Cline Fixott, Jr., Council on Hospital Dental Service; J. C. A. Harding, Council on Journalism; C. C. Poindexter, Judicial Council; J. C. Earnest, Council on Legislation; and Paul K. Musselman, Council on Dental Education, and J. C. Muhler, Council of National Board of Dental Examiners, who had completed briefer terms.

The Board reported it had designated February 8-14 as the period for National Children's Dental Health Week in 1959.

The Board also reported acceptance of a grant of $2,500 annually, for a period of five years, from the Great-West

Life Assurance Company, for the establishment of a teacher's fellowship to be administered by the Fund for Dental Education.

The Board stated that, in accord with the request of the House at its 1957 session, the amount of the Association's grant to the American Thrift Assembly had been increased by $5,000 to a total of $7,500, and that the Board would provide for a similar grant in 1959 to the Assembly, in view of the importance to dentists of enactment of federal legislation to remove the tax discrimination against the self-employed.

INCREASE IN MEMBERSHIP DUES IN 1960 ASKED

In its report proposing that membership dues be increased from 20 dollars to 30 dollars annually beginning in 1960, the Board briefly surveyed the future needs, prospects and programs of the Association. Although the growth of the Association's membership had been strong and consistent for the past ten years, large gains could no longer be anticipated since the number of new dentists each year was not much larger than the number who die or retire annually.

The Reserve Division of the General Fund had not increased since 1954, noted the Board, adding:

"The Association has had no increase in dues since January, 1951, but income has increased each year because of growth in membership and increased income from sources other than membership. It is of special interest to note the decline in annual surplus from over $500,000 in 1951 to less than $200,000 in 1957. The budget estimate for 1958 shows that the unappropriated surplus will be less than $60,000 for the fiscal year. If this trend continues, the Association will have little more than a balanced budget, and no surplus, by the end of the fiscal year 1959 unless there is new income from dues."

Although many new programs had been undertaken by the Association in the past ten years, many other worthwhile activities had been considered but could not be developed within the limits of existing funds, the Board stated.

PROPOSED BUDGET FOR 1959

In its 1959 budget, the Board said it had reduced the "budget askings" by $223,116. The recommended 1959 budget calls for reduced budget requests of $2,802,000, an estimated income of $2,702,000, an estimated excess of expense over income of $100,000, and a recommended appropriation from capital of $100,000.

The 1959 budget would be in balance only with the use of a capital expenditure of $100,000, $50,000 for the extraordinary expenses of the Centennial and $50,000 to meet the costs of operation at the present level, said the Board, adding: "The deficit which is projected may not be an actual one since some savings are normally anticipated at the end of the operating year. If these savings approach $100,000 as they have done in some recent years, the Association, in effect, will have a balanced budget for 1959 with the capital appropriation providing the needed working margin of $100,000.

"The Board of Trustees wishes to point out that if the recommended budget for the fiscal year 1959 is adopted by the House of Delegates, serious problems of a financial nature will be confronted in the fiscal year 1960 unless there is additional income and this can only come from an increase in membership dues. The Board of Trustees expresses the hope that the members of the House of Delegates will support the proposed increase of $10 when it is considered at the 1959 annual session for only in this way can the Association continue to support the programs approved and recommended by the House of Delegates and which are needed for the advance-

ment of the Association and of the dental profession."

Of the budgeted expenses, $860,190 is for administration, $271,780 for annual session, $312,113 for Bureaus and departments, $623,887 for Councils and divisions, $634,030 for publications, and $100,000 for the contingent fund.

Income from membership dues is expected to be $1,555,000; from advertising and subscriptions to Association publications, $571,000; earnings on investments, $100,000; exhibit space rentals, $150,000; sale of educational materials, $90,000; from the Council on Dental Education's Division of Educational Measurements, $90,000; from the Council of the National Board of Dental Examiners, $130,000; from the Bureau of Library and Indexing Service, $13,000, and miscellaneous, $3,000.

ACTIONS OF NEW BOARD

The new Board met the afternoon of November 13. The Board appointed the following as associate editors of the JOURNAL OF ORAL SURGERY, ANESTHESIA AND HOSPITAL DENTAL SERVICE for the terms indicated: Robert B. Shira, 1961; Bruce L. Douglas, 1961; William F. Via, Jr., 1960; S. Elmer Bear, 1960, and Herbert J. Bloom, 1959. The following were appointed to the editorial board of the afore-mentioned JOURNAL for three-year terms expiring in 1961: Lyall O. Bishop to succeed Sanford Moose; Richard J. Burch to succeed P. Earle Williams; James R. Hayward to succeed himself, and Fred A. Henny to succeed himself.

President Phillips named the following Committee on Rules and Order, with himself as chairman: Howard Higgins, Fritz A. Pierson, Edward R. White, Harold Hillenbrand (ex officio) and President-elect Jeserich as observer.

The Board will meet on the following dates in 1959: March 12-14, July 21-24, September 9-11 and September 18.

The Board reappointed as delegates to the National Health Council for terms ending with the 1959 annual session Victor H. Levitz, New Jersey; Joseph P. Scola, New York, and Rudolph H. Friedrich, Illinois.

The Board designated to represent the Association on the Inter-Association Committee on Health for the year ending with the 1959 annual session the following: Drs. Jeserich, Phillips, Kenneth A. Easlick, and Harold Hillenbrand as staff representative.

Obed H. Moen, Watertown, Wis., who has served as national treasurer for the Fédération Dentaire Internationale in the United States since 1956, was confirmed for that post for the coming year.

Floyd W. Pillars, Des Moines, Iowa, was again designated as the Association's representative on the policy making body of the American Thrift Assembly.

Five delegates—LeRoy M. Ennis, Harold M. Flickinger, C. S. Renouard, Obed H. Moen and Fred A. Peterson—were named to represent the American Dental Association at the 1959 annual session of the General Assembly of the F.D.I.

Paul H. Jeserich, Harold Hillenbrand and Bernard Conway were designated the Association's representatives to the Joint Council to Improve the Health Care of the Aged, for the coming year.

The Board appointed the following to serve as chairmen of their respective Councils:

Willard C. Fleming, California, Dental Education; John W. Green, Illinois, National Board of Dental Examiners; Herbert L. Taub, New York, Constitution and Bylaws; J. H. Eshleman, Pennsylvania, Dental Health; Thomas J. Hill, Ohio, Dental Research; Lester W. Burket, Pennsylvania, Dental Therapeutics; J. Fred Folley, New York, Dental Trade and Laboratory Relations; Thomas F. Powers, New Jersey, Federal Dental Services; O. J. McCormack, New York, Hospital Dental Service; Lawrence

R. Ludwigsen, California, Insurance; Obed H. Moen, Wisconsin, International Relations; Morris J. Wilson, Kentucky, Journalism; C. E. Rutledge, California, Judicial; Ralph E. Creig, Legislation; A. Brooks Drake, West Virginia, Membership; H. R. Bleier, Wisconsin, Relief, and David J. Fitzgibbon, Washington, D.C., Scientific Session.

Appointed as a special committee to review the Council structure of the Association and present recommendations at the 1959 spring session of the Board were the chairmen of the four board reference committees and the President serving as chairman.

The following were appointed as members of a special committee on executive compensation and retirement income programs: Fritz A. Pierson, Robert J. Wells, Paul H. Jeserich, H. B. Washburn, President Phillips, and John R. Abel as chairman.

Terms of the following members of the special committee on the survey of dentistry were continued for another year: Chairman O. W. Brandhorst, William R. Alstadt, Willard Fleming, William M. Hodgkin, Paul H. Jeserich, Harry Lyons, Percy T. Phillips, Fritz A. Pierson and H. B. Washburn.

The terms of the present members of the special committee on the Centennial —Chairman John R. Abel, Percy T. Phillips and Fritz A. Pierson—were continued for another year.

PRESIDENT'S REPORT

A recommendation that Association agencies ask Congress to enact legislation providing for greater autonomy for the dental corps of the Army and the Air Force was made November 10 by President Alstadt in his report to the House. He urged that both corps be given the same statutory authority which Congress voted for the Naval Dental Corps several years ago.

President Alstadt also recommended that: the activities and budget of the Council on International Relations be expanded; more and better dental care be provided for those in mental and penal institutions and hospitals of all types; the size of 13 councils be increased from five members to seven members each; more emphasis be given to the participation of dentists in civil defense; rehabilitation committees be established by the Association and by constituent societies to assist disabled dentists; the duties of the Association's councils be re-evaluated periodically; a special department of the Association be established to assist constituent societies in emergency situations; annual dues in the Association be increased from 20 dollars to 30 dollars; Association agencies confer with officials of life insurance companies regarding the feasibility of including dental examinations as part of the physical examinations for life insurance applicants, and continuation of support to the Jenkins-Keogh bill which would permit self-employed persons to have the same tax advantage in establishing pensions as is now accorded employees of corporations.

President Alstadt commended members for supporting the Association's successful efforts to secure a new building for the National Institute of Dental Research at Bethesda, Md., and to secure increased grants for dental research.

OTHER ACTIONS

The House, the reference committee, and the Council on Federal Dental Services extended appreciation to Major General Marvin E. Kennebeck, who retired recently from service with the United States Air Force, for his contributions to the practice of dentistry during his long career with the military and as Chief of the Dental Division of the Air Force, and to Rear Admiral Ralph W. Malone, who retired recently from service with

the United States Navy, for his contributions to the practice of dentistry during his long career with the Navy and as Chief of the Naval Dental Service.

The Council on Membership reported that, since the year 1959 marks the Centennial of the founding of the Association, the Council plans to conduct a special campaign during the year to enroll every eligible dentist and dental undergraduate as members of the Association. Efforts will be made to enlist in the campaign the support of constituent and component society officers, heads of federal dental services and deans of dental schools.

INSTALLATION CEREMONIES

Retiring officers and trustees of the Association were called to the platform by President Alstadt and presented certificates of merit for their services.

NEW PRESIDENT'S PLANS

President Phillips, in his acceptance speech, said that during the coming year he would seek action in several critical areas. He listed the following objectives: an educational program stimulating greater interest in hospital dental service, inasmuch as the hospital is "destined to be the preventive health center of the future"; examination of dentistry's role in current and future programs for the care of dependents of members of the uniformed service; achievement of dentistry's rightful place in the workmen compensation laws of the various states; a re-evaluation of dental specialty programs; expansion of dental research nationally, and increased interest in local and office research to which the private practitioner can contribute; increasing concern for the dental health of the mentally ill, of inmates of penal institutions and of the aged; an improvement in public relations and foreign relations; a re-evaluation of the assignments and the work load of agencies of the Association, and achievement of a broader base of voluntary personnel in the various councils. President Phillips invited communications from any member of the House or the Association on matters which the member thinks should come to the attention of the President.

President Phillips awarded a certificate of merit to the retiring President Alstadt. Past President Bernerd C. Kingsbury inducted Dr. Alstadt into the "Past Presidents' Club of A.D.A."

GENERAL MEETINGS AND OTHER EVENTS

It was announced that 9,823 people had attended the General Meeting Tuesday evening, November 11, in the Dallas Memorial Auditorium, and that this was the largest party in the history of the Association.

President Alstadt, in an address to the General Meeting entitled "Reflections on Being President," said that the influence of the dental profession in the United States was greater than was commonly realized. He urged every dentist to contribute annually to his alma mater.

"The dental profession has not even scratched the surface of its possibilities," said the speaker. "The Centennial year will provide us with the greatest opportunity to show the world the achievements of American dentistry."

The address was followed by entertainment representing a southwestern exposition of music and folklore and by Herb Shriner, the Indiana humorist. P. Earle Williams, chairman of the General Committee on Local Arrangements, welcomed members and guests.

A banquet honoring President and Mrs. Alstadt was held the evening of November 12. Entertainment was provided by the U. S. Army Chorus and by a musical review headed by George Liberace.

Members of the Board of Trustees, officers and guests at the 99th annual session in Dallas, (standing, l. to r.): Birger Moehlum, Oslo, Norway, official representative of the Fédération Dentaire Internationale; Charles H. Patton, Third District; C. Willard Camalier, assistant secretary; Fritz A. Pierson, Eleventh District; Paul H. Jeserich, Ninth District; Robert J. Wells, Eighth District; Howard B. Higgins, Fifth District; A. F. Schopper, Sixth District; Earl G. Jones, Seventh District; John R. Abel, Thirteenth District; Edward F. Mimmack, Second District; John S. Eilar, Twelfth District; Edward R. White, Fourth

OFFICERS AND

The annual meeting of the American Academy of the History of Dentistry was held last month in Dallas. Pictured are (left to right): Arthur H. Merritt, New York City, a past president; Robert Thoburn, Daytona Beach, Fla., president; Brig. Gen. Neal A. Harper, retired, assistant professor at the College of Dentistry, Ohio State University, and C. Willard Camalier, Washington, D. C., retiring president. Drs. Merritt and Camalier are past presidents of the American Dental Association.

District; Louis M. Cruttenden, assistant secretary, and John E. Rush, business manager. (Sitting, l. to r.): Lewis W. Thom, Tenth District; Harold Hillenbrand, secretary; Bruce F. Wilkinson, third vice-president; J. Murrey Gavel, second vice-president; Arthur W. Kellner, first vice-president; William R. Alstadt, president; Percy T. Phillips, president-elect; Arthur W. Easton, First District; Lon W. Morrey, editor; Gerald D. Timmons, speaker, House of Delegates, and H. B. Washburn, treasurer.

BOARD OF TRUSTEES

At the Conference on Dental Journalism presented in Dallas by the American Association of Dental Editors and the Council on Journalism of the American Dental Association, officers were elected. Shown are, left to right: Ralph Rosen, St. Louis, re-elected editor of the A.A.D.E.; Floyd D. Ostrander, Ann Arbor, Mich., elected president; Wesley J. Dunn, Toronto, Canada, retiring president, and Austin H. Kutscher, Highland Park, N. J., retiring secretary-treasurer.

Attendance at the Dallas session totaled 11,040, of whom 5,334 were dentists. The 1957 session in Miami Beach was attended by 11,131 persons, of whom 5,733 were dentists.

SCIENTIFIC SESSION

Essays, clinics, forums, table clinics and motion pictures were presented daily throughout the meeting at the Dallas Memorial Auditorium. On November 11, for the first time at an annual session of the Association, closed circuit television clinics originating in a dental school (the University of Texas Dental Branch in Houston) were carried by long distance telephone lines to the auditorium. The cost of the program was assumed by E. R. Squibb & Sons. During the clinics as many as 450 viewers at a time watched the demonstrations in the auditorium.

The Council on Scientfic Session presented awards to the following for outstanding exhibits:

E. J. Frederickson, Spokane, Wash., mechanical stabilization of difficult prosthetic appliances; American Medical Association, seven paths to fitness; Division of Dental Health, U. S. Public Health Service, climate and fluoridation; Joseph C. Muhler, Bloomington, Ind., practical preventive dentistry, and Air Force Dental Service, Office of the Surgeon General, dental research at the School of Aviation Medicine.

Among those to welcome members at the opening session of the House of Delegates were Governor Price Daniel, of Texas; Mayor Robert L. Thornton, Dallas; P. Earle Williams, chairman, General Committee on Local Arrangements; Wayne H. Speers, president, Texas Dental Association, and Harold B. Younger, president-elect of the Dallas County Dental Society.

Distinguished guests introduced included Dr. F. J. L. Blasingame, executive vice-president, American Medical Association, who brought greetings from the board, officers and members of his association. Dr. Blasingame expressed the hope that the Boards of Trustees of the American Medical Association and the American Dental Association could meet together in Chicago to discuss mutual problems.

Birger Maehlum, representing the Norwegian Dental Association, also was the official representative of the Fédération Dentaire Internationale. Dr. Maehlum said that many F.D.I. members planned to come to New York next September to pay homage to the American Dental Association. Others to bring greetings included Roberto M. Ruff, president of the Mexican Dental Association; Don W. Gullett, secretary of the Canadian Dental Association; Gervasio Eraña, past-president of the Philippine Dental Association; Kiyoo Aoki, of the Japanese Dental Association; Mr. Tol Terrell, immediate past-president of the American Hospital Association, and Joseph R. Anderson, associate secretary of that association's Council on Professional Practice; Mr. Henry M. Thornton, first vice-president of the American Dental Trade Association, and Mr. Homer Dickson, president, and Mr. Paul Slone, secretary, of the National Association of Dental Laboratories.

About one hundred international guests attended the annual session. A luncheon in their honor was held Tuesday noon, November 11. Brief greetings were extended by President Alstadt, President-elect Percy T. Phillips, and Secretary Harold Hillenbrand, and were responded to by several of the guests. Obed H. Moen, chairman of the Council on International Relations, welcomed the guests.

Additional coverage of important issues and events of the Association's annual session will be presented in the January issue of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION.

CENTENNIAL PLANS PROGRESS: FLEMMING TO SPEAK FEB. 9 AT CHICAGO CIVIC LUNCHEON

The Centennial year celebration of the American Dental Association will begin officially with the Centennial Civic Luncheon February 9 in Chicago.

Dr. Arthur S. Flemming, secretary of the Department of Health, Education, and Welfare, will be the principal speaker at the event, which is part of the Chicago Dental Society's Midwinter Meeting. Distinguished guests expected to attend the luncheon include Governor Stratton, Mayor Daley, and other national, civic, business and health leaders.

Elsewhere, plans for participation in centennial celebration are nearing completion. Forty-four constituent societies of the Association have now named chairmen to coordinate centennial activities in their areas.

The special committee of the Board of Trustees on Centennial Celebration includes Percy T. Phillips, Association president, Fritz A. Pierson and John R. Abel, chairman.

Postage Stamp • The U. S. Post Office Department has approved the issuance of the Association's commemorative stamp. It will be issued in New York City on September 14, 1959, the opening day of the Association's Centennial Session. Arrangements for ordering first-day covers will be announced later.

Children's Dental Health Week • President Eisenhower has signed a joint Congressional resolution naming February 8-14 as National Children's Dental Health Week.

Children's Dental Health Week kits which have been mailed to dental societies contain publicity material on the centennial celebration. Radio scripts, news releases, speeches and posters—all carry mention of the Association's 100th anniversary. In addition, the Bureau of Dental Health Education has produced five 20-second television spot announcements which may be used during the week and in connection with other centennial activities at the state and local levels throughout 1959. The films carry a dental health message and include an illustration of one of the centennial insignia.

Centennial kits have also been mailed to all centennial chairmen in addition to the Children's Week kits. These contain radio scripts, a clipsheet of newspaper articles, special speeches and press releases, background information on the Association, historical illustrations, ideas for participation in career programs and science fairs, lists of highlights in dental history and dental science, and a publicity manual.

Centennial Motion Picture • A centennial motion picture is being produced through a $30,000 grant donated by Church & Dwight, Inc. The film, saluting the dental profession, will be made available to state and local dental societies throughout the centennial year. Church & Dwight produces Arm & Hammer and Cow Brand baking soda, products which carry the Seal of Acceptance of the Association.

Purpose of the motion picture will be

to tell, dramatically and effectively, the wide-ranging story of the American dental profession. The recent intensification of research; the development of new materials, equipment and technics; the concern for the total health of the patients; the work done with cleft palate patients, the mentally retarded, the chronically ill and the aged; the momentous advances in public health—all of these areas will be explored to broaden the public's concept of the profession and the individual practitioner.

Dynamic Films, Inc., of New York has been selected to produce the film. Serving as consultants to the producers will be Percy T. Phillips, president of the Association, and Raymond J. Nagle, dean of New York University College of Dentistry. Shooting of the film is expected to start this month.

Other Grants • Dental and allied trades have indicated a strong interest in participation in centennial activities, particularly in the form of commercial support for specific projects.

The American Dental Trade Association has voted an appropriation of $15,000 for participation in the Association's celebration, with plans for the form which it will take to be announced.

Seven toothbrush manufacturers, all members of the American Brush Manufacturers Association, have contributed $5,000 to the Association for use in connection with National Children's Dental Health Week. They are: E. I. du Pont de Nemours & Co.; Fuller Brush Co.; Lactona, Inc.; Mohawk Brush Co.; Owens Brush Co.; Pro-phy-lac-tic Brush Co., and Tek-Hughes.

Ritter Company, Inc., has agreed to provide a centennial souvenir for all dentists attending the Centennial Session in New York. The souvenir will be a polished bronze reproduction of the centennial insigne, possibly attached to a key chain, money clip or letter opener. The cost will be between $6,000 and $10,000.

Johnson & Johnson has agreed to produce a documentary motion picture of the Centennial Session at a cost of approximately $10,000. The film, which will be on the order of a "March of Time" presentation, will record the highlights of the business, social and scientific programs and will be circulated to state and local dental societies after the session.

A plastic briefcase bearing the official insigne will be presented to each dentist as he registers for the Centennial Session, a gift of the Thermo-Fax Division of the Minnesota Mining and Manufacturing Co. The portfolio will contain all of the programs and official documents distributed at the registration desk and will serve as a useful souvenir of the session.

Local Participation • Plans for specific centennial events have already been announced by the following societies:

Chicago • In addition to the Centennial Civic Luncheon previously described, the Chicago Dental Society is sponsoring a Centennial Essay Contest for all student members of the American Dental Association. The contest will be on the subject "What I expect from my career in dentistry." The winning student and his wife will receive a $100 prize, an all-expense trip to Chicago at the time of the Midwinter Meeting, and he will read his essay at special ceremonies on Sunday, February 8.

Rhode Island • The Rhode Island Dental Society is planning a centennial banquet during its annual meeting, January 20-21. As part of the affair, the society will name a Rhode Island dentist as "Dentist of the Century." William Decesare is state centennial chairman.

Michigan • The Genesee County Dental Society of Flint has announced plans

for an extensive centennial program and banquet in February. Included will be the presentation of a centennial award to a nondentist who has made an outstanding contribution to the profession.

Pennsylvania • The Second District Dental Society, Northampton, has appointed a special committee to organize a centennial banquet during 1959. The society is considering a centennial award to nondentists who have rendered special assistance to dentistry.

New York • The Eighth District Dental Society will hold its annual meeting in Niagara Falls in April and will include a special centennial program. In addition, plans are under consideration for a ceremony in August marking the founding place of the American Dental Association.

Wisconsin • The Greater Milwaukee Dental Association plans to hold a Centennial Civic Luncheon February 9 to coincide with the opening ceremonies in Chicago. The possibility of a closed-circuit telephone hookup to the Chicago meeting is being investigated. The society also plans to publish a centennial edition of its journal. Truman J. Johnston has been named the centennial chairman.

ESHLEMAN APPOINTED MEMBER OF U. S. DENTAL RESEARCH UNIT

Jay Eshleman, Philadelphia, has been appointed to serve on the National Advisory Dental Research Council, Surgeon General Leroy E. Burney of the Public Health Service, Department of Health, Education, and Welfare, has announced.

Members of the Dental Research Council advise and make recommendations to the Surgeon General on research and training grants and fellowships to be awarded from Public Health Service funds appropriated to the National Institute of Dental Research, Bethesda, Md.

R. H. Sullens

R. H. SULLENS TO TAKE NEW POST AS A.A.D.S. SECRETARY

Reginald H. Sullens, associate secretary of the Council on Dental Education of the American Dental Association, has been named to fill the new position of executive secretary of the American Association of Dental Schools.

The announcement of Mr. Sullens' appointment came from Raymond J. Nagle, dean, College of Dentistry, New York University, and acting president of the A.A.D.S. Mr. Sullens will assume his new duties January 1.

Arrangements are now complete for the establishment of a full-time central office staff for the American Association of Dental Schools. Its headquarters will be in the newly-constructed office building of the American Hospital Association at 840 N. Lake Shore Dr., Chicago.

Mr. Sullens will be responsible for the business affairs of the association, comprised of 47 U. S. and five Canadian dental schools, and for the development of national programs under A.A.D.S. sponsorship. The purpose of the association is to aid in the advancement of teaching and research and to maintain high standards of training in all dental schools.

Mr. Sullens has been a member of the staff of the American Dental Association since 1951. Prior to his appointment as associate secretary of the Council on Dental Education, he was assistant secretary

of the Council and was director of its division of educational measurements.

BAIN LEAVES ASSOCIATION POST AS PUBLIC INFORMATION CHIEF

Herbert B. Bain, director of the Bureau of Public Information, resigned November 20. Mr. Bain joined the Association's former Bureau of Public Relations staff in 1946. The following year that bureau was succeeded by the Bureau of Public Information and Mr. Bain was made director, a position which he has held up to the date of his resignation.

Under his direction, the bureau expanded its activities and assumed greater responsibilities in the public relations and publications fields. The Association's semi-monthly newsletter was developed under his direction as was the daily newsletter published during the annual sessions.

H. B. Bain

Mr. Bain was particularly successful in establishing closer working relations with the lay publications and with the authors of health columns and feature articles.

Mr. Bain has accepted a position as director of public relations for the American Meat Institute.

Dental Education

WEST COAST INTERNSHIP IN ORAL SURGERY AVAILABLE

A one-year internship in oral surgery beginning July 1, 1959, is offered at the San Francisco General Hospital. This post is approved by the Council on Dental Education.

Information and application forms regarding this program may be obtained by writing to: Dr. Melvin J. Sherman, Division of Oral Surgery, School of Dentistry, University of California Medical Center, San Francisco 22, Calif.

POSTGRADUATE INSTRUCTION AVAILABLE AT MANY SCHOOLS

Albert Einstein Medical Center • A course in dentistry for the handicapped child will be given Tuesday and Wednesday, January 20 and 21 at the Northern Division of the Albert Einstein Medical Center, Philadelphia, by Morris Kelner, director of the Center.

Enrollment is limited to 20 students for each day the course is given and the fee is $75. Registration closes on January 6.

California • The University of California School of Dentistry has announced a three-year graduate program in oral surgery for the year beginning July 1, 1959. Training includes clinical and hospital experience and study in the basic sciences. The program is designed to fulfill the requirements of the American Board of Oral Surgery. Further information on the course may be obtained from the school in San Francisco. Application blanks may be requested from the University of California Graduate Division in Berkeley.

California • A course in dental therapeutics and prescribing will be given January 16 and 17 by the department of postgraduate education, School of Dentistry, University of California, San Francisco.

The fee is $40 for the course which will be taught by Sol Silverman, Jr., Frederick H. Meyers, Howard M. Myers, Violette C. Sutherland and William H. Ware. Registration closes January 10.

Nathan Friedman and Harold G. Ray will

give a course in periodontics on February 12, 13 and 14 at the same school.

Southern California • An orthodontic seminar on cephalometrics-diagnosis and angle edgewise appliance technic will be held March 2-13 at the University of Southern California.

Enrollment is limited to 24 and the closing date for applications is February 2. Tuition is $275. The instructors are Cecil D. Steiner, director, Howard M. Lang and Robert D. Payne.

Applications should be made to: Division of Postgraduate Instruction, University of Southern California, School of Dentistry, University Park, Los Angeles 7, Calif.

Georgetown • Intravenous anesthesia for the dental office is the subject of a five-day course to be given March 9-13 at the Georgetown University School of Dentistry, Washington 7, D. C. Harold Krogh and Adrian O. Hubbell are the directors.

The class is limited to 15 and tuition is $250.

Illinois • The University of Illinois College of Dentistry will offer a postgraduate refresher course in the use of premedicating agents and general anesthesia February 12-13 after the Midwinter Meeting of the Chicago Dental Society.

The course will be directed by Elaine Stuebner and the faculty will include A. G. Anderson, Reuben C. Balagot and John M. Spence. Further information can be obtained from the school, 808 S. Wood St., Chicago 12.

Loyola • Loyola University School of Dentistry, Chicago, will give two postgraduate courses in March. They are "Principles of Occlusion and Articulation," March 4, 5, and "Surgical Anatomy," March 9-13. The former will be taught by Drs. Christensen, Wentz, Sicher, Rapp and Krol; the latter by Dr. Kostrubala.

Marquette • A medical-dental seminar on hypnosis will be sponsored by the Marquette University School of Dentistry December 5-7 at the Hotel Schroeder, Milwaukee. The session is limited to physicians, dentists and psychologists and the fee of $150 includes luncheons.

The Marquette school is also offering a refresher course in complete denture prosthesis December 8-12 under the direction of D. H. Gehl. This course is limited to seven participants and the fee is $150.

Michigan • The following postgraduate courses are being offered at the W. K. Kellogg Foundation Institute: Postgraduate and Graduate Dentistry, University of Michigan:

January 5-16, complete denture prosthesis; January 12-23, orthodontics for the general practitioner; January 19-23, dental radiology; January 19-30, oral medicine, clinical oral pathology, and diagnosis; February 16-17, higher speeds for rotating instruments; February 16-20, dental therapeutics; February 16-27, partial denture prosthesis; February 23-March 6, dentistry for children; March 2-13, endodontics; March 2-13, orthodontics for the general practitioner; March 9-20, crown and bridge prosthesis; March 9-20, minor oral surgery; March 16-17, dental treatment for handicapped children; March 16-18, hydrocolloid and rubber base inlay technics; March 19-20, higher speeds for rotating instruments.

All communications concerning the courses should be addressed to Dr. William R. Mann, Association Director, W. K. Kellogg Foundation Institute, Graduate and Postgraduate Dentistry, University of Michigan, Ann Arbor, Mich.

New York • Two postgraduate courses are announced by the New York University College of Dentistry. They are:

A refresher course in periodontics and oral medicine on ten Wednesdays, February 11 to April 22; periodontics and oral medicine in the Spanish language for four weeks starting February 23. Both will be given by Sidney Sorrin and his associates.

Further information can be obtained from the Secretary, Postgraduate Studies, New York University College of Dentistry, 421 First Ave., New York 10.

Northwestern • Two courses in oral surgery and one on denture procedures are offered in March by Northwestern University Dental School. Major oral surgery will be given March 2-13 by Orion H. Stuteville and Robert B. Shira. Intermediate oral surgery will be presented March 16-20 by Dr. Stuteville, Warren R. Schram, Harold L. Harris, Kenneth W. Penhale, Benjamin J. Gans, Howard B. Adilman and Donald E. Casey. Complete denture procedures in general practice will be taught by A. H. Grunewald, Robert B. Peters, Bernard J. Eggerman and Kenneth F. Schmitt.

Inquiries should be addressed to Northwestern University Dental School, 311 E. Chicago Ave., Chicago 11.

Oregon • The University of Oregon Dental School offers six postgraduate refresher courses during January and February. Following are the topics, dates and instructors:

Pharmacology, Elton L. McCawley, January 12-13; dental materials, January 15-16, R. W. Phillips; new concepts in dentistry, January 26-27, dental school faculty; psychological problems, January 28-29, Herman Dickel; occlusal equilibration, February 9-10, Robert L. Platner, and crown and bridge, February 23-26, Wyman H. Wilson and Robert L. Land.

Inquiries should be addressed to Dr. Vinson M. Weber, head, Department of Postgraduate Education, University of Oregon Dental School, 611 S. W. Campus Dr., Sam Jackson Park, Portland 1, Ore.

Pennsylvania • Postgraduate courses listed for February and March at the University of Pennsylvania School of Dentistry include the following:

The mandibular third molar, February 9-13, P. Philip Gross; oral diagnosis and roentgenology, February 16-20, Lester W. Burket and LeRoy M. Ennis; partial dentures, February 23-27, M. M. DeVan; occluso-rehabilitation, March 2-6, Louis Alexander Cohn; principles of occlusion, March 4-6, Lewis Fox; oral medicine, March 9-13, S. Leonard Rosenthal, and applied anatomy, March 16-18, Harry S. Sicher.

Further information may be obtained from: Postgraduate Courses, School of Dentistry, University of Pennsylvania, 4001 Spruce St., Philadelphia 4.

Michael Reese • Emanuel Cheraskin and Arthur Elfenbaum will present an entirely new type of postgraduate course February 12, 13 at the Department of Dentistry, Michael Reese Hospital and Medical Center, Chicago.

The two-day course will include medical technics important to correct diagnosis, how to prescribe laboratory test and interpret reports and how to correlate clinical and roentgenographic findings. The fee is $35.

Temple • Closed circuit television and high speed equipment are offered to participants in postgraduate studies at Temple University School of Dentistry.

George Straussberg will direct a course in advanced fixed prosthesis on Wednesdays from January 7 through March 25. Clinical oral pathology will be taught by Max Jacobs January 15-17, and Robert H. W. Strang will present advanced orthodontics January 18-31.

Advanced radiodontics will be given by William J. Updegrave January 22-24, and head and neck dissection by Richard M. Snodgrasse on Wednesdays from February 4 through June 10.

Enrollment in all classes is limited. Application should be made to: Dr. Albert L. Borish, Graduate and Postgraduate Division, Temple University School of Dentistry, Broad above Allegheny Ave., Philadelphia 40.

Tufts • Occlusal equilibration is the subject of a refresher course to be given by Edward T. Fischer at the Tufts University School of Dental Medicine February 9-11. Sigurd Ramfjord will conduct a class on occlusal adjustment March 30 through April 1, and a course in minor oral surgery will be given each Wednesday from March 4 to April 22 by Richard Taylor and Max Jacobs.

Classes for each class are limited and the tuition fee for the first two is $100 and for the third, $150.

Washington • A refresher course in dental therapeutics and prescribing will be given January 10 and 11 at the University of Washington School of Dentistry. Instructors will be James M. Dille, John D. Gehrig and John I. Ingle.

The enrollment fee is $25 for dentists and $10 for dental hygienists and dental assistants. Application should be made to: Department of Postgraduate Dental Education, University of Washington School of Dentistry, Seattle, Wash.

National Defense

REAR ADMIRAL MALONE, NAVY DENTAL CHIEF, RETIRES

Rear Admiral Ralph W. Malone, DC, USN, was placed on the retired list of the U. S. Navy November 1 after 32 years of continuous active service. He was assistant chief of the Bureau of Medicine and Surgery and chief of the Dental Division, Bureau of Medicine and Surgery.

Admiral Malone's outstanding abilities were recognized early in his career and resulted in his assignment to the U. S. Naval Dental School, Washington, D. C., for three tours of duty as an instructor in crown and bridge dentistry. During such an assignment he served as the personal dentist for President Franklin D. Roose-

velt. He was assigned to the USS NEW JERSEY during World War II, and participated in two major campaigns in the Pacific—at Kwajalein and Truk Islands.

Rear Admiral Malone's promotion to flag rank came in 1952 when he assumed the duties of Inspector General, Dental, in the Bureau of Medicine and Surgery. On March 3, 1955, he became assistant chief for dentistry and chief, Dental Division, Bureau of Medicine and Surgery. He successfully directed "Operation Buildup" which reversed the trend of a decreasing Dental Corps and raised the strength of the Regular Navy Dental Corps from 700 to over 1,000 officers.

In addition to Rear Admiral Malone's military citations he has been honored by numerous civilian organizations, including Omicron Kappa Upsilon, honorary professional fraternity. He is a Fellow of both the International College of Dentists and the American College of Dentists.

At the U. S. Naval Gun Factory, Washington, D. C., on November 3 Admiral Malone was honored at retirement ceremonies sponsored by Vice Admiral H. P. Smith, USN, Chief of Naval Personnel, and Rear Admiral W. K. Mendenhall, USN, Commandant, Potomac River Naval Command.

After 32 years of continuous active service in the U. S. Navy, Rear Admiral Ralph W. Malone was placed on the retired list. He was assistant chief of the Bureau of Medicine and Surgery and chief of the bureau's Dental Division.

REAR ADMIRAL SCHANTZ HEADS U. S. NAVY DENTAL SERVICE

Rear Admiral Curtiss W. Schantz, DC, USN, was installed as the new assistant chief for dentistry and chief of the Dental Division, Bureau of Medicine and Surgery, Department of the Navy, in ceremonies held in the office of Rear Admiral Bartholomew W. Hogan, Surgeon General of the Navy, November 3. Rear Admiral Schantz relieves Rear Admiral Ralph Malone, who retired November 1 after 32 years of service.

Rear Admiral Schantz, a graduate of Marquette University, is a veteran of World Wars I and II and the Korean conflict. In World War II he headed the dental department of the Naval Training Center at Great Lakes, Ill., where he organized and administered the largest group dental practice in the world's history, with over 500 dental officers assigned for duty.

During the Korean conflict, he served with distinction as the Fleet and Force Dental Officer for the Pacific Fleet. Here he supervised the rapid expansion of dental facilities to support the Marines in Korea and the Fleet in the Far East.

Prior to assuming his duties in the Bureau of Medicine and Surgery, Admiral Schantz was Commanding Officer of the U. S. Naval Dental School, National Naval Medical Center, Bethesda, Md. In that assignment he initiated many innovations in dental teaching, pioneered professional correspondence courses for dental officers, and sponsored important research studies using radioactive iso-

Curtiss W. Schantz

topes from the reactor of the Medical Center.

Rear Admiral Schantz lives in Kensington, Md., with his wife, the former Catherine Hart McLennan of Seattle, and two sons, Malcolm and Curtiss, Jr. His daughter, Patricia, is the wife of Lt. J. J. Webb of the Navy Dental Corps.

General

GIES EDITORIAL AWARD TO WALTER HYDE FOR 1957 PIECE

Walter Hyde received the first William J. Gies Editorial Award for his editorial, "Throw-Aways," which appeared in *North-West Dentistry* in July 1957.

George C. Paffenbarger, a member of the Board of Directors of the William J. Gies Foundation for the Advancement of Dentistry, presented a plaque to Dr. Hyde at the annual meeting of the American Association of Dental Editors in Dallas last month. In congratulating Dr. Hyde for adding to his numerous contributions to dentistry, Dr. Paffenbarger pointed out that one of the purposes for which the Gies Foundation was founded, and among William J. Gies' primary interests, was the promotion and aid of nonproprietary dental journalism.

This award, which includes a prize of two hundred dollars, will be an annual event. Graduate dentists are invited to submit editorials published in nonproprietary dental journals in the United States and Canada for the 1958 award. Papers should be limited to 750 words, appear in the 1958 volumes of the journals, and should be submitted to the chairman of the editorial award committee, Dr. John P. Traugott, 121 E. 60th St., New York 22, N. Y., by February 1.

NEW COUNCIL FOR RESEARCH ON ORAL PATHOLOGY FORMED

To encourage scientific research of dental schools and laboratories connected with a college or university, a new association, "Groupement pour la recherche scientifique en pathologie de la bouche" (Council for Research on Oral Pathology), has been formed in France.

The association will publish a bulletin in four languages containing contributions of its members. American dentists, engaged in scientific work on oral pathology, are invited to collaborate with this international organization.

Inquiries for further information should be addressed to: Dr. Maurice Aouyssou, Secretary General, 61, Rue d'Alsace-Lorraine, Toulouse, France.

FETE MRS. C. S. FABER, EDITOR OF NEW YORK DENTAL JOURNAL

Mrs. Celestine S. Faber, managing editor of the *New York State Dental Journal*, was honored with a surprise testimonial dinner October 7 at the Hotel Statler, New York City.

Percy T. Phillips, new president of the American Dental Association, praised Mrs. Faber for her conscientious work on behalf of the publication for more than 15 years. He noted that during Mrs. Faber's association with the *New York State Dental Journal*, edited by Charles F. Bodecker, it had achieved a preeminent position in dental journalism.

The dinner was attended by Dr. Bodecker, and Bruce L. Douglas, Robert L. Heinze, Austin H. Kutscher and Norman M. Ordene, associate editors. Also

Architect's sketch of the new National Institute of Dental Research building which is expected to be finished in the fall of 1960. Construction of the $3,700,000 building, in Bethesda, Md., will begin early next year.

present were members of the council on publications, the secretary of the Dental Society of the State of New York, several friends, and members of Mrs. Faber's family.

COOK-WAITE LABORATORIES NAME TWO EXECUTIVES

Vernon W. Rooke, Jr., has been elected president of Cook-Waite Laboratories, Inc., it was announced by James Hill, Jr., chairman of the board of Sterling Drug Inc., the parent company.

Mr. Rooke succeeds Everett L. Hoskins, president of the company since 1933, who becomes chairman of the board of Cook-Waite, a leading manufacturer of local anesthetics and related products for the dental profession.

Mr. Rooke is chairman of the professional and laboratory relations committee, American Dental Trade Association, and has served as chairman of both the association's program committee and the exhibit and sales research committee.

Mr. Hoskins, who becomes Cook-Waite's board chairman, has spent his entire 44-year business career in the dental industry. He was named vice-president and sales manager of Cook Laboratories, Inc., in 1924 and president in 1932, when he was also elected president of Antidolor Manufacturing Co., Inc. Both firms were subsequently merged into Cook-Waite Laboratories, with Mr. Hoskins as president.

He is currently completing two years' service as chairman of the manufacturers' section, American Dental Trade Association, and is a member of its board of directors. Over the years he has participated in most of its committees, and was chairman of the program, foreign trade, membership and nominating committees.

COUNCIL ON DENTAL HYPNOSIS SETS FEBRUARY MEETING DATE

The American Council on Dental Hypnosis, consisting of representative teachers of hypnosis in dentistry, met in Chicago October 31. Arthur Kuhner, as chairman, set the next meeting of the Council for February 9, 1959, to coincide with the Chicago Dental Society Midwinter Meeting. Members of component societies are invited to attend.

PHILADELPHIA V.A. HOSPITAL HAS OPENINGS FOR INTERNS

The Veterans Administration Hospital of Philadelphia is accepting applications for a rotating dental internship for the year beginning July 1, 1959.

Information and application forms may be obtained from the chief of the dental service of the hospital at University and Woodland Aves., Philadelphia 4.

DENTAL TREATMENT BY RADIO FEATURE OF ANTARCTICA LIFE

Dental treatment by radio voice conference is one of the refinements of practice in Antarctica. From the Navy facility at Little America, Lt. Max J. Perlitsh, Navy dental officer wintering over at the station, frequently gives long distance advice by radio to the physician at Byrd Station whenever the latter is confronted by serious dental problems.

Dr. Perlitsh provides for the oral health of 85 Navy and 24 International Geophysical Year personnel in the Antarctica. He works without the conventional equipment of the modern dental office—pump chair, high speed dental drills, running water, and so forth.

A graduate of Brandeis University and Tufts University School of Dental Medicine, Dr. Perlitsh is the only dental researcher as well as practitioner at Little America.

JOHN P. TRAUGOTT FILLS TERM ON GIES FOUNDATION BOARD

The Board of Directors of the William J. Gies Foundation for the Advancement of Dentistry has named John P. Traugott to fill the vacancies caused by the death of S. Ellsworth Davenport, Jr. He succeeds Dr. Davenport as vice-president for the unexpired term ending January 31, 1959, and as a member of the Board of Directors for the period ending January 31, 1960.

Dr. Traugott is a former member of the Board of Directors of the First District Dental Society, New York, and a former secretary of the New York Academy of Dentistry. He served in the Dental Corps of the U. S. Naval Reserve from 1943 to 1946 with the rank of Lieutenant Commander.

A.A.A.S. SYMPOSIUM THIS MONTH FEATURES DENTAL RESEARCH

The Dental Section of the American Association for the Advancement of Science will hold sessions during the morning, afternoon and evening of December 29 when the Association meets at the Hotel Shoreham in Washington, D. C.

The symposium, under the chairmanship of Reidar F. Sognnaes, is entitled "Calcification in Biological Systems," and is co-sponsored by the A.A.A.S. Sections on Medicine and Zoology and by the International Association for Dental Research, North American Division, the American Dental Association and the American College of Dentists.

Roy O. Greep, professor of anatomy and dean, Harvard School of Dental Medicine, will be the moderator.

Also • Clemens V. Rault, dean of the Georgetown University Dental School, was elected chairman of the Public Health Advisory Council, a group of prominent and qualified citizens appointed by the Commissioners of the District of Columbia to advise the Public Health Department. . . . Robert J. Gorlin, professor and chairman of the oral pathology department of the University of Minnesota School of Dentistry, is the new chairman of the dental division of the Cancer Coordinators. He was elected at a recent meeting in Chicago held in conjunction with a meeting of the American College of Surgeons. . . . Capt. J. A. English, DC, USN, on duty at the Office of Naval Research, Navy Department, Washington, D. C., had his election as a member of the Commission on Scientific Assembly approved by the General Assembly of the Fédération Dentaire Internationale. . . . Charles W. Craig has resigned as editor of the *Journal of Dental Education*. Marion W. McCrea, University of Minnesota School of Dentistry at Minneapolis, has taken over the post.

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

The ILWU-PMA dental program: first year statistics

V. Cost of dental care received

Payment for dental services provided under the ILWU-PMA program was based on fee schedules developed for the nine plans. These schedules varied somewhat, reflecting differences in the fees charged by practicing dentists in the different areas. Fee schedules for Oregon and Washington plans were lower than those for California plans. The figures on cost of service are a measure of the amount of service received, although not a precise measure because of differences in fee level in the various plans.

The variation in cost of initial care among the 7,787 patients is shown in Table 21. For one out of every 13 patients, the cost was less than $10. For one out of approximately 300 patients, the cost was more than $300. Over half of the patients 1 to 4 years of age had initial costs of less than $20, compared to only 14.2 per cent in the 5 to 9 age group and 11.2 per cent in the 10 to 14 age group.

The spread of costs for the recall care received by 2,499 patients is shown in Table 22. Although 83.2 per cent of the patients had dental bills of less than $40 in the recall episode, much larger bills are shown for a scattering of patients, including bills of $100 or more for 1.5 per cent of the recall patients.

The percentage distribution of patients according to combined costs for initial, recall and emergency care is shown in Table 23. The cluster of patients with costs in the "$70 to $79.90" bracket undoubtedly reflects the $75 limit of care receivable under the three insured plans in California. About 10 per cent of the patients had costs of $140 or more during the pilot year.

Of all children enrolled in insured plans, 18.5 per cent received care above the monetary limits ($75 in California and $95 in Oregon and Washington) during the pilot year of the program. Charges in excess of these limits were paid by the patient but are included in the costs as presented in this chapter to the extent that dentists recorded the extra charges on treatment records. The percentage of patients incurring charges not payable by the plan varied from 7.5 per cent in the Washington insured plan to 24.1 per cent in the San Francisco insured plan.

The dental bills of 37.1 per cent of all children enrolled in service plans were above the limits stipulated for insured plans in the same state.

The average (mean) cost of services received, by two-year age groups and by sex, is shown in Tables 24, 25 and 26. The average cost of initial services was $64.03. By age, the figure was lowest for the lowest age group ($14.38) and highest for the highest age group ($86.46). Costs went up with age with the excep-

The first four articles in this series appeared in The Journal in August, September, October and November 1958.

Table 21 • Percentage distribution of patients according to cost of dental care received in initial episodes, by age

Cost of services	Age			
	1–4	5–9	10–14	All ages
– $9.90	30.5	4.2	3.0	7.8
$10.00– $19.90	22.9	10.0	8.2	11.3
$20.00– $29.90	9.9	9.5	9.9	9.7
$30.00– $39.90	7.3	9.0	9.1	8.8
$40.00– $49.90	5.7	9.1	9.2	8.6
$50.00– $59.90	5.7	8.5	8.6	8.1
$60.00– $69.90	4.0	8.7	8.9	8.1
$70.00– $79.90	3.7	10.5	11.1	9.7
$80.00– $89.90	2.7	6.8	5.4	5.5
$90.00– $99.90	2.3	4.4	4.6	4.2
$100.00–$119.90	2.0	7.1	6.6	6.1
$120.00–$139.90	1.3	4.1	4.2	3.7
$140.00–$159.90	.7	3.2	3.4	2.9
$160.00–$179.90	.4	1.8	2.1	1.7
$180.00–$199.90	.2	1.3	1.7	1.3
$200.00–$249.90	.4	1.6	2.3	1.7
$250.00–$299.90	.3	.1	.9	.5
$300.00–	.0	.1	.8	.3
Total	100.0	100.0	100.0	100.0

Table 22 • Percentage distribution of patients according to cost of dental care received in recall episodes, by age

Cost of services	Age			
	1–4	5–9	10–14	All ages
– $9.90	25.5	20.8	18.1	20.5
$10.00– $19.90	26.6	24.2	23.0	24.1
$20.00– $29.90	25.2	27.1	25.3	26.1
$30.00– $39.90	9.0	13.8	12.7	12.5
$40.00– $49.90	5.4	5.7	7.7	6.5
$50.00– $59.90	3.2	2.8	4.8	3.6
$60.00– $69.90	1.8	1.8	2.9	2.2
$70.00– $79.90	.9	1.3	2.2	1.6
$80.00– $89.90	1.6	.4	.7	.7
$90.00– $99.90	.4	.6	.9	.7
$100.00–$119.90	.2	.9	.7	.7
$120.00–$139.90	.0	.3	.4	.3
$140.00–$159.90	.2	.1	.1	.1
$160.00–$179.90	.0	.1	.1	.1
$180.00–$199.90	.0	.1	.1	.1
$200.00–$249.90	.0	.0	.2	.1
$250.00–$299.90	.0	.0	.0	.0
$300.00–	.0	.0	.1	.1
Total	100.0	100.0	100.0	100.0

Table 23 • Percentage distribution of patients according to cost of dental care received in initial, recall and emergency episodes, by age

Cost of services	Age			
	1–4	5–9	10–14	All ages
– $9.90	18.3	2.9	2.6	5.2
$10.00– $19.90	20.9	6.4	5.0	8.1
$20.00– $29.90	11.4	6.9	7.2	7.8
$30.00– $39.90	10.7	8.0	7.8	8.3
$40.00– $49.90	7.3	9.4	9.1	8.9
$50.00– $59.90	7.2	9.1	8.4	8.5
$60.00– $69.90	6.0	9.7	9.3	8.9
$70.00– $79.90	4.9	11.7	12.1	10.8
$80.00– $89.90	2.8	7.2	7.2	6.5
$90.00– $99.90	3.1	4.7	5.0	4.6
$100.00–$119.90	3.1	8.9	7.5	7.4
$120.00–$139.90	1.7	5.0	5.3	4.6
$140.00–$159.90	1.0	3.5	4.1	3.4
$160.00–$179.90	.5	2.4	2.7	2.2
$180.00–$199.90	.3	1.5	1.8	1.5
$200.00–$249.90	.5	2.1	2.8	2.1
$250.00–$299.90	.3	.5	1.1	.7
$300.00–	.0	.1	1.0	.5
Total	100.0	100.0	100.0	100.0

Table 24 • Mean cost of services received during initial episodes, by age and sex

Age	Boys	Girls	Both
1–2	$15.50	$12.93	$14.38
3–4	39.99	38.14	39.08
5–6	57.54	60.84	59.20
7–8	72.19	71.64	71.92
9–10	66.77	64.83	65.81
11–12	62.25	70.76	66.55
13–14	81.87	91.53	86.46
All ages	62.51	65.60	64.03

Table 25 • Mean cost of services received during recall episodes, by age and sex

Age	Boys	Girls	Both
1–2	$17.15	$17.57	$17.35
3–4	24.77	24.20	24.47
5–6	24.44	24.31	24.37
7–8	27.66	23.84	25.66
9–10	21.48	25.80	23.63
11–12	29.35	27.24	28.26
13–14	32.07	32.40	32.22
All ages	26.11	25.34	25.84

Table 26 • Mean cost of services received during initial, recall and emergency episodes, by age and sex

Age	Boys	Girls	Both
1–2	$20.99	$19.92	$20.53
3–4	47.99	47.22	47.61
5–6	65.69	69.28	67.50
7–8	80.75	79.74	80.26
9–10	73.78	72.98	73.38
11–12	71.16	79.97	75.59
13–14	89.68	98.94	94.07
All ages	70.46	73.91	72.18

Table 27 • Mean cost of services received during initial-episodes, by plan and age

Plan	Age			
	1–4	5–9	10–14	All ages
San Francisco Service Plan	$33.99	$93.20	$99.63	$86.62
San Francisco Insured Plan	31.18	52.09	57.33	53.08
Wilmington Service Plan	30.58	72.35	73.16	62.65
Wilmington Insured Plan	27.28	46.36	43.64	42.71
Oregon Service Plan	37.53	59.81	66.37	59.73
Oregon Insured Plan	*	*	*	*
Washington Service Plan	35.60	67.35	92.22	72.03
Washington Insured Plan	29.71	53.17	51.61	48.36
California Small Ports Insured Plan	23.32	46.33	48.02	44.79
All plans	$32.64	$66.47	$73.31	$64.03

*Too few cases for reliable statistics.

Table 28 • Mean cost of services received during recall episodes, by plan and age

Plan	Age			
	1–4	5–9	10–14	All ages
San Francisco Service Plan	$21.55	$32.24	$28.89	$29.63
San Francisco Insured Plan	16.03	17.98	18.95	18.20
Wilmington Service Plan	29.53	32.47	34.34	32.10
Wilmington Insured Plan	18.41	18.25	17.31	17.85
Oregon Service Plan	18.75	25.58	31.98	27.46
Oregon Insured Plan	*	*	*	*
Washington Service Plan	14.96	18.36	26.40	20.98
Washington Insured Plan	*	*	*	28.33
California Small Ports Insured Plan	22.00	28.67	26.29	26.59
All plans	$22.66	$24.94	$28.20	$25.84

*Too few cases for reliable statistics.

tion that costs in the 7 to 8 year age group ($71.92) were higher than for the 9 to 10 and the 11 to 12 year age groups, for both boys and girls.

For the two upper age brackets, including ages 11 through 14, initial care costs averaged about $9 more for girls than for boys. This difference is significant at the 1 per cent level of probability.

The average cost of the recall care re-

Table 29 • Mean cost of services received during initial, recall and emergency episodes, by plan and age

Plan	Age			
	1–4	5–9	10–14	All ages
San Francisco Service Plan	$36.54	$100.31	$107.01	$93.05
San Francisco Insured Plan	35.09	55.41	60.21	56.22
Wilmington Service Plan	45.18	84.01	83.68	74.52
Wilmington Insured Plan	33.61	51.58	48.68	47.99
Oregon Service Plan	44.74	71.05	79.87	71.41
Oregon Insured Plan	*	*	*	*
Washington Service Plan	41.34	76.75	101.38	80.78
Washington Insured Plan	30.07	59.28	58.18	53.68
California Small Ports Insured Plan	27.99	49.87	51.81	48.56
All plans	$40.58	$74.66	$81.48	$72.18

*Too few cases for reliable statistics.

ceived by 2,499 children was $25.84. The variation in cost with age was much less for recall care than for initial care, because of the virtual absence of differences in length of time since last visit to a dentist.

Fifty-nine children received dental care classified as emergency care, at an average cost of $25.94 per child. Almost half (45.7 per cent) of the bills for emergency care were for amounts less than $10.

The average cost of all services received per child during the year was $72.18. The 7,822 children received initial, recall and emergency care valued at $564,579.70.

For initial care, average cost per child was highest in the San Francisco service plan ($86.62) and lowest in the Wilmington insured plan ($42.71) (Table 27). For all service plans combined it was $70.28. The average for all insured plans was $47.90, 31.8 per cent less than for service plans.

The cost per child for recall care, shown in Table 28, was highest in the Wilmington service plan ($32.10) and lowest in the Wilmington insured plan ($17.85). As noted in Chapter IV, the Wilmington service plan provided sodium fluoride treatments to a far greater proportion of recall patients than any other plan. The mean cost per child of all care received during the year in each plan is shown in Table 29.

The Bureau of Economic Research and Statistics estimates that the national average dental expenditure by children in the 1 to 14 age bracket is about $11 during the course of a year for those who see the dentist. The figure is about $5 per child when based on the entire population in that age bracket, including those who do not see the dentist.

The average cost at six months recall for children under the ILWU-PMA program was $25.84, which projects to $51.68 per year. The difference between this figure and the estimated national average is accounted for only in small part by dental fees on the West Coast, which are about 30 per cent higher than the average fees for the entire country.[1] The difference is accounted for mainly by the great amount of dental neglect in the general population.

The next chapter in this series will be an analysis of services received according to tooth number.

1. American Dental Association, Bureau of Economic Research and Statistics. Dental fees in 1956. J.A.D.A. 55:585 Oct. 1957.

COUNCIL ON DENTAL RESEARCH

Changes in American Dental Association Specification Number 14

The following is a notice of changes in American Dental Association Specification No. 14 for Dental Chromium-Cobalt Casting Alloy.

1. Paragraph 4.3.1 Composition should be changed to read: 4.3.1 Composition. At the option of the American Dental Association, certification by the manufacturer that the alloy contains no less than 85% of chromium, cobalt, and nickel may be considered to satisfy the composition requirement. Otherwise the composition shall be determined by wet analysis. Analyses for chromium, nickel and cobalt shall be made by procedures given in J. Research NBS 53:353 (1954), ASTM Methods of Chemical Analysis of Metals (1950) Chemical Analysis of Iron and Steel, by Lundell, Hoffman and Bright, or by methods demonstrated to be of equal accuracy. The determined values for metallic constituents shall be recorded as the nearest 0.5 per cent. When a determined value falls midway between a half and a whole number, the whole number shall be recorded.

2. Paragraph 4.4.2 Compliance with specification should be changed to read: 4.4.2 Compliance with requirements for tensile properties and for hardness. An alloy complies with the requirements for tensile properties and for hardness when all of the determined values for three or more of the set of six specimens meet the requirements. The determined values shall be recorded for each specimen. The recorded values for yield strength, tensile strength, elongation and hardness shall be obtained by averaging the determined values for each of the foregoing properties for all specimens (in any one series of six specimens) which comply with the requirements.

3. Paragraph 4.4.7 Fusion temperature should be changed to read: 4.4.7 Fusion temperature. The fusion temperature shall be the liquidus temperature as determined by cooling curves. The manufacturer shall determine and certify the fusion temperature. The American Dental Association may, at its option, accept such certification as satisfying the fusion temperature requirement.

4. Table 14-1 should be changed with regard to the fusion temperature part to read:

	Fusion Temperature °F	
Type	Minimum	Maximum
I	2400	—
II	—	2400

These changes are effective immediately.

COUNCIL ON DENTAL HEALTH

Urban sprawl and health

A National Health Forum on "Urban Sprawl and Health," sponsored by the 63 national organizations which work together in the National Health Council, was held in Philadelphia, March 18 to 20, 1958. R. H. Friedrich, secretary of the American Dental Association's Council on Dental Health and delegate to the National Health Council, participated in a panel discussion on the impact which the rapid growth in suburban living has on personal and community health. Dr. Friedrich's comments concerning the dental aspects of the problem follow:

Few studies have been directed to the effect of suburban development on the distribution of dentists and on dental practice. Some of the collateral information developed from general studies of dental practice and from membership records of dental societies indicates certain significant facts and trends. Individual case histories and practice habits of dentists also furnish some reasonable bases for anticipating dentists' response to population changes.

The 1956 Survey of Dental Practice conducted by the Bureau of Economic Research and Statistics of the American Dental Association shows, on the basis of the number of patients per practice and the gross and the net income of the dentist, that dental care is significantly more available in the suburban business area than in other areas. The urban downtown area follows close behind and slightly ahead of the urban neighborhood business area. The suburban residential area and the urban residential areas drop off noticeably in availability of dental care.

In general, it may be said that established practitioners are reluctant to relocate their practices until the inconvenience of their location to patients who have moved away from the vicinity of the practice is reflected in pressures from those patients. Accordingly, the dentist practicing in the urban neighborhood now finds himself faced with the problem of whether (1) to follow the wage earner's family and relocate his practice in an outlying suburban business district, (2) to move to the downtown area of the city for the convenience of the wage earner who prefers to obtain his dental care in close proximity to his business location or (3) to move to an urban neighborhood business center.

The younger dentists tend to locate their practices in newer but established suburban areas which have a higher child population and a higher level of dental health education among the population generally than do other areas. These factors make it possible for the dentist to become established more quickly and to develop a stable family dental practice, convenient to a highly desirable living environment for his family and himself. The younger dentist has also developed a real enthusiasm for the care of children, the dental service which offers the greatest potential for truly preventive care.

The trends in distribution of dental specialists are consistent with the distribution of general practitioners. Orthodontists have shown a decided preference for those areas with high child populations and accessibility to good transportation. Frequency of visits and relatively short appointments are not compatible with difficulty of access to the office or inconvenience in transportation.

Oral surgeons tend to utilize central

locations with easy access to large numbers of people. They also must consider the accessibility of hospitals for the management of the more serious problems.

The membership experiences of the larger city dental societies indicate quite clearly a trend toward suburban locations. A recent report from the Los Angeles County Dental Society states, "Freeway and city traffic apparently are behind a noticeable decentralization of dentist population in Los Angeles County. During the past three years, while the First District (Los Angeles proper) has been losing 82 members, the four remaining districts have gained 174."

It can be concluded, then, that dentists will tend to locate their practices in areas that are readily accessible to those large population groups where there is a high level of understanding of the value of sound dental health and an appreciation of the benefits of good dental care and who have available to them convenient methods for meeting the costs of dental care.

There are few problems to be concerned about with regard to those people who are able to purchase dental care through their own resources. For those groups who are unable to meet the costs of dental care through their own resources but who have access to credit, there are an increasing number of budget payment programs sponsored by dental societies and banks. There is little doubt that a sprawling population will pose certain problems for such plans in covering patients over a wide geographic area —sometimes reaching over state lines— since such plans operate best through centralized administration of their professional and economic aspects.

The distribution of dentists will be affected also by the expansion of group purchase plans for dental care which involve the use of the resources of an organized group for the purchase of a stipulated amount of dental care for eligible members of the group. Such a plan tends to raise the dental health education level of the individual members and to increase their desire to avail themselves of dental care. As these programs develop and expand, it is reasonable to anticipate that dentists will be attracted to the areas where people live who are covered by such plans.

Probably the most serious problem which can be expected to develop will be in the operation of public assistance welfare programs for dental care. It is reasonable to assume that the suburban shift contains a high percentage of the self-sustaining population, thus resulting in a concentration of lower income and indigent population in the urban area.

If the trend toward the centralization of dental practices in suburban business centers, urban downtown and neighborhood business areas continues, there will be fewer dentists available to meet the needs of what can be expected to be an expanding public assistance welfare health program. To compound this anticipated difficulty are the general lack of funds to support the costs of such programs for dental care, particularly for children, and the relatively low level of dental health education of the group. It should be noted, however, that the improvement of the federal matching formula for grants for health care under public assistance has already had a considerable effect on the development and expansion of public assistance welfare programs for dental care. It seems reasonable to predict that, as methods for meeting the costs of care for this segment of the population are developed to the point where such programs can compete for the available dental manpower and the level of dental health appreciation of the group increases, the dentists will locate their practices in the vicinity where there is a demand for dental care.

The changing pattern of population distribution will also have an effect on the special problems arising in any pro-

grams for providing dental care to special disease groups in the field of chronic illness and health care of the aged and in providing dental care for the retarded or physically handicapped child and adult. Many of the solutions will depend on the location of special treatment centers for these specialized groups. Certainly, the expansion of the concept of the hospital as a community health center, where all aspects of health care are made available, will have an effect on dental practice. It is safe to predict that, whatever trends develop in the social and economic patterns for the utilization of dental care, the American dental profession will continue to maintain its high professional standards in meeting the health needs and demands of the people. It will, of course, guard diligently the integrity of the dentist-patient relationship in order to prevent any decline in the quality of dental care which the people receive.

BUREAU OF LIBRARY AND INDEXING SERVICE

American Dental Association Film Library

Effective January 1, 1959, a new schedule of rental fees will go into effect. Those for 16 mm. films will range from $2.50 to $5.50 and average about $3.50. Filmstrips will rent for $1.50, and slide rentals will range from $1.50 to $3.50, depending on the number of slides in the set.

The film rental fee is a service charge that covers a part of the cost of handling and distribution. The entire cost of purchasing materials for the film collection is subsidized by the Association. The revised fees share the handling costs with the user and will result in an improvement in the quality of Film Library services.

A revised edition of *Audio-Visual Materials in Dentistry* is in preparation and is scheduled for distribution early in 1959. The revised rental fees will be listed in the catalog. The new edition will be mailed automatically to dental schools and dental societies. Other film users will be sent a catalog on request.

The following films have been added to the collection and are available from the Film Library.

FILM REVIEWS

Applied Principles of Upper and Lower Implant Dentures • 16 mm., magnetic sound, color, 33 minutes. Revised in 1958 by E. J. Kresse, D.D.S., and Fred Metz, D.D.S., Denver. This film is also known by the title, *Rehabilitating the Edentulous with Implantation*. Rental from A.D.A. Film Library, $5.

Progress in implantation is reviewed and models are used to show the application of implants. Both Ticonium and plastic implants are considered. The armamentarium is shown for the first stage surgery for the bone impression technic. A special flap retractor is used. The implant is secured with screws in the second stage. The construction of the dentures, with the superstructure, is shown. Both upper and lower implant technics and denture design are demonstrated.

Diet Did It • 16 mm., sound, color, eight minutes, 1957. Produced by the College of Medical Evangelists, 1720 Brooklyn Ave., Los Angeles. Available for purchase from producer; rental from A.D.A. Film Library, $2.50.

The film discusses diet and its effect on general health. In a visual research report based on the study of white rats, the correlation between diet and weight gain and cavities

is shown. A considerable increase in dental caries is apparent in the diet-deficient group of rats. Meats are not included in the balanced diet used for the control group in the experiments.

Operative Procedures for the Acrylic Full Cast Crown • 16 mm., sound, color, 19 minutes, 1958. Produced by Martin Entine, 3037 N. Broad St., Philadelphia 32, and the S.F.H. Syncrolite Corporation. Available for purchase from the producer; rental from the A.D.A. Film Library, $4.50.

Laboratory Procedures for the Acrylic Full Cast Crown • 16 mm., sound, color, 32 minutes, 1958. Rental from the A.D.A. Film Library, $2.50.

These two films show the chairside procedures and the laboratory technics in the construction of an acrylic veneer full cast crown for a lower molar. "Operative Procedures" covers anesthesia, tooth preparation, tube impressions, supplementary quadrant impressions and temporary aluminum crown protection for the tooth between visits. Final cementation is shown. "Laboratory Procedures" shows detailed laboratory phases of construction including copperplating, soldered die construction, wax-up, casting, acrylic veneering and final polishing of the same crown shown in "Operative Procedures." The film may be rented separately, but complement each other nicely in a program.

Treatment of Paradontosis • 16 mm., silent, black and white, 58 minutes. Produced in 1926; postscript added in 1958 by Frank Kaiser, D.D.S., 415 N. Camden Dr., Beverly Hills, Calif. Producer may be contacted for purchase; rental from the A.D.A. Film Library, $2.50.

After comment on "pyorrhea" as a focal infection, the effects on bone structure are shown. Bone structures are diagrammed and their effect on the support of soft tissues is delineated. The surgical removal of bone when the condition is advanced is deemed necessary. Early diagnosis and preventive treatment is recommended. Examination, preparation for surgery and the A. W. Ward instruments are shown. The use of curet, knife, scaler and hoe is demonstrated on a patient. Postoperative views, polishing, and home care are shown.

In spite of the age of this film, the content is informative. The postscript refers to some of the changes in technic since the film was made.

COUNCIL ON DENTAL THERAPEUTICS

Council announces classification of additional products

The classification of products by the Council on Dental Therapeutics has been described in a previous report (J.A.D.A. 40:489 April 1950). The Council's program now provides for classification of products in Group A, Group B, Group C and Group D. Products are reconsidered periodically, and decisions are subject to change at any time that a substantial amount of new evidence becomes available. The files of the Council contain information on many drugs and dental cosmetics and inquiries are welcome.

GROUP A

Listing of products in Group A means that at the time of their consideration, the items conformed with the provisions for acceptance established by the Council on Dental Therapeutics and adopted by the Board of Trustees and the House of Delegates of the American Dental Association. Items in this group will be listed in *Accepted Dental Remedies*, and may use the Seal of Acceptance, unless otherwise provided.

The following additional products are classified in Group A:

Menadione Tablets, U.S.P. (See A.D.R. 1959, p. 119)

Menadione Tablets, U.S.P. (Eli Lilly and Company): A brand of menadione tablets, U.S.P.

Sorbitol Solution, N.F. (See A.D.R. 1959, p. 172)

Sorbitol Solution, N.F. (Merck & Co., Inc.): A brand of sorbitol solution, N.F.

Zinc Oxide-Eugenol Preparations (See A.D.R. 1959, p. 165)

Zinc Oxide-Eugenol Temporary Filling—Zogenol Brand (Stratford-Cookson Co.): Powder: Each 100 Gm. is stated to contain zinc oxide, 99.8 Gm.; zinc acetate, 0.2 Gm. Liquid: Eugenol.

GROUP B

Listing of products in Group B means that there is insufficient evidence to justify their present acceptance, but there is reasonable evidence of their usefulness and safety. These products meet the other qualifications and standards established by the Council on Dental Therapeutics. It is the Council's opinion that Group B products may be promoted for special use and study.

The Council's initial consideration of products which may be eligible for Group B listing is influenced favorably by the knowledge of further investigations then in progress. It is the policy of the Council to reconsider Group B products each year on the basis of new evidence which may be produced in their support. Classification in this category is not ordinarily continued for more than three years.

GROUP C

Listing of products in Group C means that the evidence is so limited or inconclusive that the products cannot be accurately evaluated. It is the Council's opinion that Group C products require further study by qualified investigators.

The following additional products are classified in Group C:

Carbomycin (See A.D.R. 1959, p. 71)

Carbomycin (*Magnamycin* — Chas. Pfizer & Co.) has been reclassified from Group B to Group C by the Council on Dental Therapeutics. See report on carbomycin below.

GROUP D

Listing of products in Group D means that they are unacceptable because of their demonstrated inability to meet the standards outlined in the provisions for acceptance.

Council reclassifies carbomycin (Magnamycin) in Group C

An earlier report by the Council announced the classification of carbomycin (Magnamycin-Pfizer) in Group B.[1] The status of this antibiotic was reviewed at the end of a two year period. The manufacturer advised the Council that no new evidence was available relating to the specific use of carbomycin in dentistry. The scarcity of reports in dental literature, along with recent reviews on antibiotic therapy[2,3] indicate that evidence is too inconclusive for an accurate evaluation of the usefulness of carbomycin in dentistry.

In view of these considerations, the Council has reclassified carbomycin (Magnamycin-Pfizer) in Group C.

1. American Dental Association, Council on Dental Therapeutics. Council announces classification of additional products. J.A.D.A. 52:353 March 1956.

2. Jawetz, E. Antimicrobial chemotherapy. Ann. Rev. Microb. 10:85, 1956.

3. Krantz, J. C., Jr., and Carr, C. J. Pharmacologic principles of medical practice, ed. 4. Baltimore, Williams & Wilkins Co., 1958, p. 188-189.

BRIDGE CONSTRUCTION WITHOUT IMPRESSIONS

By Victor Penzer, D.D.S., Jamaica Plain, Mass.

A technic will be described for the construction of crowns and sanitary bridges without the nuisance of taking a single impression. The obvious advantages of the technic are:

1. The inaccuracies which impression-taking and the construction of models may induce are eliminated.
2. The technic is easy; no special skill is required, and the services of a dental laboratory become less necessary.
3. The technic is less time-consuming than any other method.
4. The technic is inexpensive.
5. The quality of the bridges thus constructed is unsurpassed.

METHOD

The abutment teeth should be prepared in the conventional manner. Good preparation is a condition for success. The circumference of the prepared teeth at the gum line is measured with a loop-wire dentimeter. The length of these teeth is also measured.

The measurements are transferred to a sheet of gold (I use 20 carat, 30 gauge plate). Bands are cut with laboratory scissors. (I prefer to cut them 0.5 mm. shorter than the tooth circumference, and 1 mm. longer than the tooth length.) Thus crowns that fit snugly and extend 1 mm. underneath the gingival margin are obtained.

The bands are curled into rings, making sure that both edges remain in contact throughout the entire length for trouble-free soldering.

Copper wire is wound around the rings to keep them in position until they are connected by solder. The rings are then soldered over a Bunsen burner and the copper wire removed.

An attempt should be made to insert the rings over the abutment teeth; if they are too tight (as they will be if cut 0.5 mm. short) they are placed on an anvil and tapped all around with a small hammer until they fit.

The gingival margins of the rings are trimmed to reach uniformly 1 mm. under the gingiva and finished to a knife edge. They are then removed and shaped with the contouring pliers to produce proper contact points and buccal and lingual curvatures. The rings are then reinserted in position in the patient's mouth.

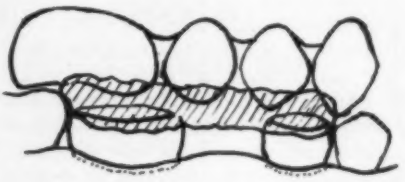

Fig. 1 • Gold rings are inserted in position; occlusal surfaces are covered with inlay pattern resin, and patient is instructed to bite in centric occlusion

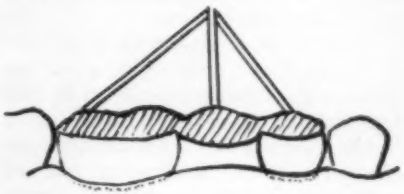

Fig. 2 • Pontic and all occlusal surfaces are carved in a single unit and sprue pins attached

The occlusal surfaces of the abutment teeth are lubricated and a mixture of powder and liquid of an inlay pattern resin such as Duralay is prepared. The consistency of this mixture should be such that a roll may be formed which can be pressed in position with the fingers.

The patient is instructed to bite in centric occlusion. After the resin has hardened the patient is told to move his jaw in all directions and grind away wherever it is necessary to obtain smooth articulation. Anatomical occlusal surfaces are then shaped, and where more bulk is needed resin or inlay wax is applied. The gingival surface of the pontic is also carved to provide for optimum accessibility.

With this procedure a pattern of all occlusal surfaces and the pontic in one single unit has been obtained. It is cast, finished and the gold rings are soldered on. The dentist will find he has constructed a perfect bridge with less work and expense, and with less annoyance to the patient, than with any other method.

351 Centre Street

Observations of Korean dentistry

John McInnes, D.D.S., M.S., Tucson, Ariz.

Severance Union Medical College and Hospital was Korea's first institution of western medicine. At one time the dental department was the pride of all Asia so far as dentistry was concerned. Today one third of all physicians in Korea are graduates of that school. War's bombing, invasion and occupation, with the accompanying destruction and looting, decimated the entire hospital.

To aid in the rehabilitation of the dental section, I was assigned there for two years by the Presbyterian Board of Foreign Missions. Mrs. McInnes and I lived within the grounds of the hospital and Medical College, overlooking one of Seoul's largest refugee camps. We spent our time teaching in the college, rehabilitating the dental department, and working to upgrade the character of dental service rendered. For one semester I taught a class—a survey of American technics—to the senior class in Korea's only dental school, Seoul National University Dental College.

DENTAL HEALTH

The Korean facial morphology is characterized by high cheek bones and a broader maxilla and mandible than is true in Caucasians. The result is less crowding of teeth and a better occlusion than is seen in the United States.

A survey of the DMF rate of caries in university students of theology, medicine and nursing revealed that 30 per cent of the students had no decayed, missing or filled teeth. Later a survey of patients of all ages coming to the Church World Service chest clinic revealed that 15 per cent of this group were free from decayed, missing or filled teeth. Any American dentist knows that this is in sharp contrast to the situation in the United States.

POSSIBLE REASONS FOR TOOTH EXCELLENCE

The following remarks may help to explain the excellent teeth of the Koreans.

1. In Korea, which has an annual per capita income of about $80, the people of necessity have simple diets relatively free from refined sugars.

2. Calcium, I am told by the nutritionist on the Severance College staff, is well supplied by the ample quantities of sea food in the diet.

3. The fluorides and trace minerals also come from seaweed and other sea food in the usual diet.

4. "Sung Nyung." Vigorous prophylactic measures are carried out after meals in a very ancient and practical ritual. "Sung Nyung," hot clear water washings from the rice cooking kettle, is served in little brass bowls to each person. This water is used to swish out the mouth in the exact manner suggested in the studies by Freeman of Northwestern University Dental School.

5. Tooth picks. Sophistication has not progressed far enough in even the most elegant Korean society to prevent a thorough removal of food particles from between the teeth. This is done in a way reminiscent of a harmonica player. The left hand carefully shields the teeth from the view of companions while the right methodically passes a wooden point to each interproximal space.

6. Toothbrushing is well established as a morning routine, using salt and a brush or salt on the finger.

PROBLEMS IN DENTAL PRACTICE

With a population of 25 million, Korea has less than 1,000 licensed dentists. Technicians and unlicensed personnel with some dental training and education and a few dental graduates who have not yet passed the examinations, do a considerable amount of the work, especially in the villages. The Korean Dental Association is working for better control of licensure. The inadequate salaries of enforcement officers cause a tendency to laxity in law enforcement and evasion of the licensing laws.

SUPPLIES

The obtaining of adequate equipment and supplies is difficult. Money is scarce; import dollars hard and expensive to obtain. The cost of freight from West Germany, Hong Kong, or the United States, makes all imported goods expensive. The high duties on imported goods and the delays in customs houses cause annoyance to those who purchase goods abroad.

The black market supply of dental goods is still large enough to affect the price of legitimate supplies and in some manner to deter the importation of goods by regular importers. So far as the ultimate purchaser is concerned, it is difficult to ascertain whether a package came into the market through legitimate means or from the black market as stolen goods.

DENTAL TRAINING

Thanks to postwar U. S. Armed Forces aid to Korea, the 500 student Dental College has a rather satisfactory supply of dental equipment. Instruments are scarce. Graduates coming to the internship program have an average of ten hand instruments, two books, and a supply of stones and burs which fit into a 35 mm. color film container.

The library at the Seoul National University Dental College contains a fair number of Japanese and English texts. There is practically no dental literature in the Korean language. The experience in loss of books has led the faculty to make access to the facilities of the library by the students somewhat difficult.

The cost of dental service has kept clinical instruction at a minimum, so most of the instruction is by lectures in the Korean language by professors who have read and studied Japanese texts. There is a growing number of instructors who have studied in America, so that there is a trend toward the use of American textbooks and a greater acceptance of American dental technics.

KOREAN DENTISTRY

Korean dentistry is characterized by the profuse use of gold and gold-colored metals in the form of ill-fitting crowns, and by the extensive use of an arsenic trioxide method of pulp mummification. Roentgenographic examination reveals a high incidence of periapical disease.

DENTISTRY AND MEDICINE

Although there are eight medical colleges, Korea has only one dental school. The medical colleges require two years of premedical college level work as a prerequisite to admission, whereas dental students are enrolled directly from high school.

Another factor that has caused a wider gap between the competence of dentists and physicians is the graduate study program arrangements. Dozens of physicians obtain graduate training in the United States for every dentist that obtains such experience. This is primarily because many medical internship and residency opportunities provide an acceptable salary, whereas there are few such vacancies in the field of dentistry in American hospitals.

A move is on foot to establish a second

dental college. This would be a small enrollment college of select students who have had a two year predental course. Yon Sei University at Seoul has tentative plans to establish such a course. The critical item is a small American staff which might go to Korea for four or five years, train the Korean dean, Korean staff, and help to set the standards at a high level.

This is a current challenge to American dentistry.

1600 East Speedway

Tasmanian denturist act lauded by lab group here

Dentists in the United States will be interested in a news letter that has been circulated by the Independent Laboratories Association acclaiming the passage of the Tasmanian (Australia) Dentists' Act of 1957. This was mentioned in the News from Australia in the August issue of THE JOURNAL.

The bill provides for the setting up of a dental mechanics board which would examine and license technicians to deal directly with the public.

Terming it a "crack in the armor of intolerance opposing the Dental Technician" the letter goes on to say:

> What has been done in Australia we can do, if we work at it hard enough, combine forces, and act with force and initiative instead of being contented to sit back and wait. We can't sit this one out. It will be too long a wait. Most of us wouldn't be able to survive that long. Apparently the Australian Dental Technicians weren't content to sit around twirling their thumbs either. THEY ORGANIZED! GOT THE BILL PASSED! Congratulations, Australia, and we want you to know WE'RE NOT GOING TO BE LEFT FAR BEHIND YOU.

According to the I.D.L.A. letter, the Tasmanian bill provides that "a dental mechanic may on his own account and in direct relationship with the public, undertake, take impressions for, supply or carry out the mechanical construction, adjustment and fitting of artificial dentures for a human subject on a certificate of a dentist that the subject's mouth is in a fit state to receive artificial dentures."

To quote further:

> A dental mechanic's registration board has been set up under this new measure, part of its function being to establish a course of training for Dental Technicians (Denturists) and to conduct examinations in order to ensure that the requisite standard is reached. The course must include clinical and theoretical aspects of denture construction, but, as there is no precedent to follow, and there is neither a dental school nor hospital in Tasmania able to teach these courses, provision for training is still to be made.

In view of this last statement, it is interesting to note that Margaret Hjorth, THE JOURNAL's correspondent in Australia, said that 41 candidates presented themselves to the Dental Mechanics Board in Tasmania for examination and 28 passed the necessary requirements for registration.

Dentistry in Czechoslovakia

Vera Poncová

The Nationalized Health Insurance Law of 1948 granted 90 per cent of the Czechoslovakian population medical and dental treatments free of charge. Drugs, roentgenograms and therapeutic (orthodontic) appliances, with a few exceptions, are included in the free service.

Considerable sums from the federal budget are spent on dental care, especially preventive procedures. In 1955, this amounted to about 1 per cent of the budget.

Patients pay only a part of the cost for material used in the construction of crowns and bridges which frequently are made of gold or gold alloys.

All health services are under the control of the Ministry for Public Health which functions through the public health departments of the regional committees. In every district there exists a department of dentistry which is a component part of the district polyclinic. The director of the dental department serves as an adviser to the Minister for Public Health and provides guidance on methods to be used in all dental clinics and polyclinics established in colleges and other schools and in factories.

Preventive dental care is provided for preschool and school children, students and workers, soldiers, pregnant women and patients with infectious diseases. Where treatment is indicated, endodontic, orthodontic and prosthetic service is rendered free of charge. This includes construction and insertion of partial or complete dentures and orthodontic appliances.

Free oral surgery, performed at clinics and polyclinics, includes operations in the maxillofacial region, whether they are necessitated by inflammatory processes, benign or malignant tumors, accidental injuries, or inherited or acquired deformities.

The following types of health workers are employed in the governmental dental service: physicians, dentists (both having the M.D. degree), registered dental technicians, dental, health and children's nurses. The total number of dental health workers is about 12,000.

One oral surgeon and three dentists are available for about 3,500 patients. The average time spent by one dental practitioner is 45 hours weekly during which time he treats 138 patients.

The training of dental students falls within the sphere of responsibility of the Ministry for Education and Culture. The Minister for Public Health cooperates with the Minister for Education and Culture in designing and carrying out educational programs, and determining the number of students to be admitted yearly to the eight dental colleges of the medical schools of universities. The professional training of dental technicians, assistants and nurses remains in the hands of the Minister for Public Health.

The Nationalized Health Insurance Law makes it compulsory for all dentists to improve their qualifications by taking postgraduate courses and conducting dental research at the Dental Research Institute or at the dental colleges. There are no fees for postgraduate courses and the participating dentists receive their full salaries during this specialized training. Private dental (and medical) practice in Czechoslovakia is abolished.

Sokolovská 15, Prague 10, Czechoslovakia

Translated and reprinted from Prakticke zubni lekarstvi, August 1957.

Guides for authors

1. Manuscripts should be mailed to Editor, *The Journal of the American Dental Association,* 222 East Superior Street, Chicago 11, Illinois.

All articles are accepted with the understanding that they are contributed exclusively to THE JOURNAL and that the material has not been published elsewhere.

2. Manuscripts must be typewritten on 8½ by 11 inch bond paper. They should be double spaced, with wide margins.

3. Titles should be concise.

4. Each author's name, highest academic or dental degree and his address must appear on the first page. If professional appointments are given for one author they must be stated for all authors. The name of the institution where the work was done should be included.

5. Generic names are preferred to identify drugs.

6. If possible the paper should be concluded with an informative summary, not exceeding 250 words, that is intelligible without reference to the main text of the article.

7. References should be numbered in the order in which they appear in the text and listed at the end of the manuscript in corresponding order. References should conform to the style indicated in the following examples:

Wolcott, R. B. Failures in dental amalgam. J.A.D.A. 56:479 April 1958.

Anderson, G. M. Practical orthodontics, ed. 8. St. Louis, C. V. Mosby Co., 1955.

8. All illustrative material, photographs, drawings, charts, must be submitted with the manuscript. They must be unmounted, glossy prints, numbered consecutively in Arabic numerals and marked for "top." The author's name and the abbreviated title of the paper should be written lightly in pencil on the edge of the reverse side of each illustration so as not to deface the illustration. Drawings and charts should be in India ink on white paper. Their size preferably should not exceed 8½ by 11 inches. Graphs should be on white or blue-lined heavy paper and arranged to conserve vertical space. Tables should be prepared in proportionate size to the page of THE JOURNAL. Each table, provided with a title, should be typed on a separate sheet. Illustrations and tables should be referred to in the text by number.

9. A brief legend should be provided for each photograph, graph, diagram or drawing but not incorporated in it. Clips should not be used to fasten legends to illustrations. They should be typed in a list with numbers corresponding to those on the photographs or drawings, etc.

10. Galley proofs or edited copy will be sent to the authors for correction.

11. Price list and an order blank for reprints will be mailed when the article is scheduled for publication. Orders for reprints must be returned promptly; otherwise reprints cannot be furnished at the prices quoted.

Book Reviews

TASCHENBUCH DER PRAKTISCHEN MEDIZIN (HANDBOOK FOR MEDICAL PRACTICE)

Edited by Johannes Kottmaier. Fourth edition. 1,135 pages. Index. DM.45.80. Stuttgart, Georg Thieme, 1957.

The high standard of material and presentation, observed in previous editions of this handbook, is maintained throughout the 1957 issue.

Although most of the 25 contributions were written by medical specialists for physicians only, some are on topics directly or indirectly related to dentistry. American readers who are able to master the sometimes difficult phraseology of scientific German will find it worthwhile to study the following chapters: Professional Diseases, by H. Buckup; Surgical Technics, by H. Franke; Psychosomatic Medicine, by J. Cremerius; Diseases of the Mouth, Teeth and Jaws, by H. H. Rebel; Diagnostic Methods, by R. Stahl; Accepted Medical Remedies, by G. Kuschinsky, and Rays, Electrical and Mechanical Vibrations in the Service of Medicine, by R. du Mesnil de Rochemont and C. Montag.

The book is well printed and its size is convenient.

John P. Herrick

FIT TO TEACH

Yearbook of the American Association for Health, Physical Education and Recreation, edited by Fred V. Hein, 247 pages. $3.50. Washington, D. C., 1201 16th Street, 1957.

Fit to Teach was prepared under the direction of a Yearbook Commission working in close cooperation with other departments of the National Education Association.

This book, directed specifically to the health aspects of the task of the teachers, is designed as a practical guide for teachers and school administrators and as a ready reference for physicians, dentists and nurses serving the schools.

Today major health problems and resources available to help solve them are discussed in terms of teachers' functions, personal health and the effect on their pupils.

Although every teacher has the basic responsibility for the promotion and maintenance of his health, *Fit to Teach* points out the responsibilities of the school administrator, board of education, professional associations and the community for providing working conditions which would contribute to teacher health.

Dentists will be interested in knowing that dental conditions that could be corrected are listed among the basic factors that influence health. The importance of having a personal dentist and continuous routine dental care are considered essential to total health. The seven specialties of dentistry are defined so that teachers may understand better the resources available for dental care.

Perry J. Sandell

HISTOLOGY

By Arthur Worth Ham, M.D. Third edition. 894 pages with 582 illustrations, including eight color plates. Index. $11. Philadelphia, J. B. Lippincott Co., 1957.

A reviewer accepts a revised text with a certain amount of skepticism as to how much revision has occurred in the new edition. This is a book wherein every chapter has been altered, in most instances through expansion of content. Certain sections have been rewritten with little content expansion, while a few parts have either been condensed or eliminated.

The author is to be congratulated on his style of writing. He has assembled a scientific book so as to make the reading of its contents one of ease. His opening chapters are undoubtedly designed to create within the student a desire to know and to like histology. The use of simple illustrations of methods of approach to this study lessens the complexity of the subject.

The most extensive changes are to be found in the chapter on the cell. It is a splendid discussion of the topic with fine comparisons between the findings of the light microscope and the findings of the electron microscope.

In the field of research, the electron microscope has been instrumental in bringing forth new findings, and these findings have been incorporated within their respective fields. In all instances where this type of material has been added, it has been augmented with excellent electron micrographs.

The subdivision "Fine Structure" has found a place in several chapters to bring more specifically minute details to the reader.

Histochemistry is discussed in various chapters along with the endocrines and the influence they exert in tissue characteristics.

Other significant contributions pertain to transplantation of tissues, blood clotting, and calcification of cartilage. The entire section on teeth has been revised.

Each chapter closes with an extensive bibliography, greatly expanded over previous editions.

The book is beautifully illustrated with 64 new illustrations, bringing the total to 582. Eight of these are color plates. Many of the new illustrations are electron micrographs, some of which are a full page. There are a few drawings and some artists' conceptions of tissues and parts of organs.

In closing, let us say "It is a job well done."

J. Robert Schumaker

PATHOLOGY

By W. A. D. Anderson, M.A., M.D. Third edition. 1,402 pages with 1,294 illustrations and 11 color plates. Index. $16. St. Louis, The C. V. Mosby Company, 1957.

With the exception of some additions and changes in the chapters concerning spirochetal and venereal diseases, the pituitary and adrenal gland, and the female genitalia, this third edition of *Pathology,* edited by W. A. D. Anderson, perpetuates the high standards set by the previous editions. The basic principles of pathology and special organ pathology are ably presented in the traditional conventional manner. Those individuals requiring a reference text which compiles the available facts will find this a good one.

For students of the health sciences, however, there still exists the need for a textbook which presents the basic principles of pathology from the viewpoint of altered physiology. This is especially true for students of dentistry. The teaching of pathology as primarily a branch of morphology limits our understanding of the pathogenesis of disease. This can be exemplified best in our presentation of dental caries, wherein the classical morphologic description of the carious lesion is but one single facet in the complex etiology of this disease.

Although the book has undergone several editions the unfortunate death of Dr. Bauer in 1956 has left the chapters on the pathology of the "Lips, Mouth, Teeth, and Neck" essentially unchanged since the first edition. In particular, his section on diseases of the teeth and their supporting structures could stand further revision.

Of special interest to those in the dental profession are the chapters on the pathology of the skin by Dr. A. C. Allen, the bones and joints by Dr. G. A. Bennett, and the vitamins and deficiency diseases by Dr. H. Pinkerton.

Leo M. Sreebny

HEMOPHILIA AND HEMOPHILIOID DISEASES

Edited by Kenneth M. Brinkhous, M.D. 265 pages with illustrations. Index. $7.50. Chapel Hill, N. C., University of North Carolina Press, 1957.

The proceedings of the international symposium on hemophilia and hemophilioid diseases, held in New York City in August 1956, are recorded in this important volume. Participants in the discussions represent many scientific disciplines in addition to hematology, such as biochemistry, genetics, pathology, physiology, orthopedic surgery, dentistry and psychiatry. The seven sections of the book are divided into 29 chapters covering all phases of the subject from highly technical investigations on the theoretical aspects of the condition to practical methods of hemorrhage control.

The prognosis of hemophilia, which was once considered almost uniformly fatal, has been considerably improved the last two decades. Since extraction of teeth is the most frequent surgical ingression in hemophiliacs, it behooves dentists to be familiar with technics for the proper management of these patients, such as are described briefly in this text by Dr. Paul Levine of New York City.

This treatise provides a kaleidoscopic view of current ideas in the broad field of hemophilia. Not only should this book be required reading for all research workers in the field, but also it should be recommended reading for those professional persons who must deal with the multiple medico-dental, psychological, and socioeconomic problems facing hemophiliac patients and their families.

James Springer

DEUTSCHER ZAHNÄRZTE KALENDER 1958 (ALMANAC FOR GERMAN DENTISTS 1958)

Edited by Ewald Harndt. Seventeenth edition. 386 pages with 157 illustrations. Index. DM 14. Munich, Carl Hanser, 1958.

The 1958 edition of this German dental yearbook presents an excellent view of German dentistry. It deals with each branch of dentistry separately and competently without the polemical flavor frequently present in European dental literature. Sensibly organized, it

contains more than 20 contributions of distinguished German specialists and dental educators.

For the American reader the following articles seem especially interesting: (1) "Odontogenic Complications in the Region of the Temporomandibular Joint," by Werner Holler; (2) "Surgical Timing in the Restoration of Patients with Cleft Lip, Cleft Jaw or Cleft Palate," by Joachim Gabka; (3) "High Frequency Methods Used in Cavity Preparation," by Charles T. Bonsack; (4) "Newly Introduced Instruments and Technics Used in Endodontic Practice," by David Haunfelder; (5) "Principles of Roentgen Diagnosis of Diseased Temporomandibular Joints," by Hans Heuser; (6) "Impression Taking in the Edentulous Lower Jaw," by Rainer Strack; (7) "Prosthetic Restoration in Patients with Periodontal Disease," by Karl Eichner; (8) "Diagnostic Procedures in Orthodontics," by Werner Jacobshagen; (9) "Professional Diseases of Dentists," by Ewald Pieper; (10) "The Most Important Accepted Dental Remedies," by Robert von Werz, and (11) "How to Improve and Enlarge My Dental Practice," by E. S. Priester.

Attractive in appearance, excellently edited, printed and illustrated, this book can be recommended to dentists and dental students who want to keep up with what is happening in German dentistry and dental research.

Paul H. Glucksman

MEDICAL RADIATION BIOLOGY

By Friedrich Ellinger, M.D. 945 pages with 83 illustrations. $20. Springfield, Ill., Charles Thomas, 1957.

This comprehensive and beautifully organized text contains an exhaustive evaluation not only of the biological effects of ionizing radiations such as those from x-ray tubes and radioactive materials but also from ultraviolet radiation, the various colors of visible light, and infrared radiation. The effects of each type of radiation are listed chapter by chapter according to the various organs. There is an eight page chapter on the effects of ionizing radiation on the tissues of the oral cavity. It includes the acute and chronic effects of radiation on the oral mucous membrane, salivary glands, tonsils, teeth and supporting structures, pulp and radiation osteonecrosis of the jaws, enamel and dentin. Brief mention is made of the effects of radiation on the oral microbial flora. Although the chapter is rather short it contains 44 references including a number to the author's own work.

Other chapters cover radiation effects on the digestive tract, respiratory tract, nervous system, eye, ear, skeletal bone and cartilage, hair, skin, thyroid, pituitary and other endocrine glands, blood-forming organs, blood, circulatory system, metabolism, radiation sickness, effects on progeny, wound healing, inflammation, parasites, infectious new growth (granulomas), benign neoplasms, malignant neoplasms, and ionizing radiation originating from sources within the body. Other chapters include ionizing radiation as a health hazard, the effects of bone-seeking radioactive substances such as radium and so forth. The bibliography occupies 244 pages and contains 4,600 references to the American and foreign literature.

Although this is hardly textbook material for the undergraduate curriculum, it is a must for graduate students in such fields as oral surgery, oral roentgenology, radiology, and pathology, and for dentists interested in the effects of radiation. The author states that the purpose of the book is "to cover our knowledge of the biological effects of radiation in their relationship to diagnostic, therapeutic, preventive and military medicine." The text is well written and has ample introductory material for the beginning student.

Needless to say more of us in private practice, because of our responsibilities in dental society activities in connection with radiation hazards, will need to have available books of this type.

W. W. Wainwright

UNESCO: PURPOSE, PROGRESS, PROSPECTS

By Walter H. C. Laves and Charles A. Thomson. 469 pages. Appendixes. Index. $7.50. Bloomington, Ind., Indiana University Press, 1957.

This is probably as detailed a source book as one could possibly hope to find—on any subject whatsoever. The authors are eminently qualified to produce a work such as this, both having had many years of experience with the federal government—specifically, having been associated with UNESCO here and abroad since 1947.

The text is divided into 15 chapters and three parts: (1) UNESCO's origins, its character, and the evolution of its program; (2) UNESCO's work; how it has been used by member states, and (3) program-makers, national policies, and an appraisal. The excellent supplementary material at the end of the book (notes, appendixes, index) complements the factual text material ideally and makes reference easy.

The objectives of the book, which have been fulfilled faithfully, are stated: "The purpose of this book is to review the first

ten years of a relatively new kind of international agency: the United Nations Educational, Scientific, and Cultural Organization. . . . This book is . . . an explanation and analysis of its program. (It) tries to explain for the general reader what UNESCO has done and why, and, to the extent that judgment may be possible, how useful UNESCO has been."

Technically, the book is well prepared, also. It will be a worthwhile addition to almost everyone's library.

Theodore C. Levitas

VOM WESEN DES ARZTTUMS (ON THE NATURE OF MEDICINE)

By Joseph Schumacher, Dr. med. et phil. Second enlarged edition. 153 pages. DM. 16.50. Stuttgart, Ferdinand Enke, 1957.

This volume is a treatise on the history of medical philosophy. The main part of the work contains only 89 pages. The remainder consists of notes, remarks and excerpts on medical philosophy from sixteenth to twentieth century writers.

Declaring that the true doctor must know the medical philosophy of the past in order to understand that of the present, the author devotes the first three chapters to the three men whom he considers the founders of medical philosophy: Plato, Hippocrates and Paracelsus. The last-named was a German humanist who lived in the time of the Renaissance.

The fourth chapter on the "Times since Paracelsus" is the outstanding chapter of the book. The author analyzes the materialistic concepts of the nineteenth and twentieth centuries that led to the present "crisis of medicine." The chapter closes with an appeal for the strict observance of the Hippocratic oath and the maintenance of the doctor in his position, not as a medical technician or a spare part of a state mechanism, but as a physician administering to the physical, mental and spiritual ills of the whole man. The author discusses euthanasia with such deep concern that the reader calls to mind the circumstances under which some doctors must have had to work during wartime.

The philosophical position of the author in this work is that of the postexistentialist, eagerly reassessing the unique personality of the individual member of society, a consideration that gives the doctor an ever more important role as a true physician in his "I-you" relationship to the ever more troubled patient of modern society.

At times in this work the reader senses an author tense with emotion and driven by an urgent conviction that he must get his message across to the present and future doctors of the world.

DEUTSCHES ZAHNÄRZTLICHES ADRESSBUCH 1957 (GERMAN DENTAL DIRECTORY 1957)

Edited by Rolf Braun. Fifth edition. 1,205 pages. Index. DM. 25. Dortmund-Mengede, E. Arnold, 1957.

The fifth edition of this dental directory, published under guidance of the German Dental Association (Bundesverband der Deutschen Zahnärzte), appears to be enlarged but much easier to use. It includes a geographical listing of the 35,017 licensed dentists of West Germany, arranged alphabetically; a list of dental schools, and of constituent dental societies.

This book, well printed and bound, is an excellently prepared, authoritative and concise directory and should have its rightful place in every American dental library.

John P. Herrick

PREVENTIVE MEDICINE FOR THE DOCTOR IN HIS COMMUNITY

By Hugh Rodman Leavell, M.D., D.P.H., and E. Gurney Clark, M.D., D.P.H., and 19 contributors. Second edition. 689 pages with tables and charts. Index. $10. New York, The Blakiston Division, McGraw-Hill Book Company, Inc., 1958.

"This book is directed primarily toward the development of a point of view, a philosophy, and a method of approach to health promotion and disease prevention. We have sought to present a way of looking at health and disease which we believe is essential to the conscientious practitioner who wants to give his patients the kind of thoughtful care they are fast learning to expect."

Thus wrote the authors in their preface. And they adhered to their objective with great tenacity throughout this all-inclusive text. The material is divided into three parts: (1) basic principles; (2) application of principles, and (3) public health-preventive medicine as organized community action. An index comprising 24 pages indicates that this "epidemiologic approach" is, indeed, all-inclusive. It would be difficult to think of a phase of the healing arts that has been omitted.

Dental health is mentioned in several places, but the main discussion appears in Chapter 10, "Natural History and Prevention of Oral Disease." These 20 pages were prepared by Reidar F. Sognnaes, associate dean, Harvard School of Dental Medicine, and Dr. James H.

Shaw, associate professor of biochemistry at the same school, and are written for the nondentist.

The text is well-prepared and readable. Intended primarily for those in or expecting to enter private (medical) practice, the book should be invaluable.

Theodore C. Levitas

DIGEST OF PREPAID DENTAL CARE PLANS 1958

By Walter J. Pelton, D.D.S., M.S.P.H., and Richard W. Bowman, A.B., Division of Dental Resources, Public Health Service. Printed revision and expansion of Mimeographed digest for 1957. 46 pages. Public Health Service Publication No. 585, U. S. Department of Health, Education and Welfare, Washington, D. C., Government Printing Office, 1958.

Growing interest of the American people in insurance against cost of dental service was reflected in heavy demand by dental organizations and consumer groups for the Mimeographed edition of this digest issued in 1957. The information, therefore, was brought up to date for the 1958 edition. The new, printed publication includes brief summaries of 83 prepaid dental care plans and covers all major plans of this sort sponsored by unions, employers, or fraternal groups as of March 1958.

The plans are divided into two principal classifications: (1) those offering "regular prepaid dental benefits," including all plans that provide any type of unrestricted restorative service; and (2) those offering "limited prepaid dental benefits," including plans that do not provide any restorative services, those that provide only limited indemnity for such services, or those that provide them as reduced fee benefits at established charges to the subscriber. Under the two main classifications, the plans are subdivided into four groups according to sponsorship: (1) communitywide; (2) union; (3) employer-employee, and (4) fraternal. The table of contents constitutes an index of the plans, listed alphabetically under the two main headings and four subheadings.

Facts on topics such as areas served, type of benefits, methods of operation, number of enrollees, eligibility, benefits, exclusions, costs, and fees are succinctly stated for the individual plans in easily scanned outlines in which the main headings are set in bold-faced type. Fee schedules of four plans operating in California, Oregon, Washington State, and New York City are detailed in a four-page appendix table.

The clear, attractive typography and orderly arrangement of the handbook invite repeated use. Five blank pages at the back provide space for memoranda.

Robert A. Downs

AIDS TO PUBLIC HEALTH

By Llewelwyn Roberts, M.D., M.R.C.P. Eighth edition. 335 pages. Index. $3. Baltimore, Williams & Wilkins Co., 1957.

For its purpose as expressed in the preface this book may possibly be of value as reference material for "medical students and others preparing for examinations in public health and preventive medicine." Certainly dental public health personnel are not included among the "others" since the subject of dental health is notable solely by the scant reference made to it. When a 335-page volume devotes less than 50 lines to the topic of dental health, not only is the probable disinterest of dental health personnel readers understandable but, also, the reasons for the oft reported poor dental conditions of British citizens more comprehensible.

And when, as late as 1957, reference to the caries preventive benefits of "fluorides in drinking water" is covered by the statement that they "may lead to mottling of the secondary teeth and may also prevent dental caries" the author's knowledge of the whole subject of dental public health seems justifiably open to question. In future editions the editorial employment of a qualified public health dentist seems indicated.

By contrast the nondental aspects of this book are remarkably comprehensive. With details sometimes minimized for the sake of conciseness, the book seems to touch on every modern public health problem of a medical character. The chapter on public health administration will be of interest to American readers as will the appendix covering the British "National Insurance Acts."

Although the type face used offers some difficulty in readability, a comprehensive index adds value to the book.

Richard C. Leonard

THE PHARMACOLOGIC PRINCIPLES OF MEDICAL PRACTICE

By John C. Krantz, Jr., and C. Jelleff Carr. Fourth edition. 1,313 pages with illustrations. Index. $14. Baltimore, Williams & Wilkins Co., 1958.

This enlarged edition has new chapters on the local use of drugs in ear, eye, nose and throat practice, and on the use of drugs in the treatment of the mentally ill. Descriptions

of many new drugs (approximately 140) and new evidence on the action of well-established drugs are found throughout the volume. For example, there are descriptions of new short-acting intravenous anesthetic agents, a new diagram on the mechanism of curare action, a new version of the chapter on epilepsy, a section on drugs used in paralysis agitans, new hypnotics, some of the new central nervous system stimulants and many other drugs.

The authors have preserved the readability and simplicity of style that have made the former editions attractive to students. The formulas for drugs are printed in a neater and more attractive form. Some old drugs, no longer important, have been omitted. The chapter on drugs for the mentally ill gives summaries of actions of no less than 15 drugs currently under investigation in this rapidly developing field. The chapter on anesthetics particularly is good, and the discussion of the treatment of infectious diseases, especially the description of the antibiotics, has been enlarged profitably.

According to the author: "The principle aim of the fourth edition of this treatise is the same as that established in the previous editions. It is expressed in the title. 'Principles' embraces what to do and why; 'practice' is how to do it and when."

Harold C. Hodge

PHARMACOLOGIE ET PHARMACOTHÉRAPIE DENTAIRE (PHARMACOLOGY AND DENTAL PHARMACOTHERAPY)

By O. Noeppel. 354 pages. Index. 3,500 fr. Paris, Masson et Cie., 1958.

The latest addition to the monographs on stomatology issued under the direction of Professor M. Dechaume is a useful listing of drugs and other remedies that are utilized in dental practice. Among those included are local and general anesthetics, analeptics, cardiovascular agents, antihistamines, antibiotics, sulfa drugs, fluorides, vitamins and hormones.

This little volume is intended to serve dental students who must know the drugs which they will be using, and practicing dentists who may use it as a guide when selecting from among the numerous drugs presently available.

The chemical formulas of the agents are included as well as indications and contraindications for their use.

There has long been a need for such a volume in the French language. The editor, Dr. Noeppel, indicates in his introduction that revisions of the volume will be issued from time to time because of the changes in therapy and the new drugs that are being discovered continually.

A complete alphabetical index adds immensely to the usefulness of the book. Any researcher in therapeutics might be wise to have this volume available, and dental schools would do well to include it in their libraries.

Geraldine Udell

LOUIS PASTEUR

By Pasteur Vallery-Radot. 197 pages. Index. $3. New York, Alfred A. Knopf, 1958.

This is an intimate and affectionate biography of the details of Pasteur's life written by his grandson. Louis Pasteur was born in France in 1822 at a time when little was known about the world of microorganisms. His introduction to the field of bacteriology was his discovery that fermentation resulted from the action of bacteria. From this point Pasteur dedicated himself to the world of microscopic life. From his studies on the fermentation of wine Pasteur devised the method that is now internationally known as pasteurization. He killed the harmful microbes by heating wine for several minutes at 131° F. This procedure revolutionized the wine industry in France.

In 1877 Pasteur began a study of pathogenic organisms—first anthrax, then staphylococci and later the virus causing rabies. He also introduced the concept of sterilization in surgery.

Since he was a chemist and not a physician, Pasteur became engaged in an unending fight with the medical profession. Physicians of that day could not conceive that anyone outside their profession knew anything about disease.

Stimulated by the earlier production of smallpox vaccine, Pasteur experimented successfully with the attenuation of other organisms. He was the first to produce a vaccine for rabies.

Although there have been other biographies of Louis Pasteur, none could be more dramatic and readable than this one written by his physician grandson.

F. C. Cady

A DICTIONARY OF CONTEMPORARY AMERICAN USAGE

By Bergen Evans and Cornelia Evans. 567 pages. Preface. $5.95. New York, Random House, 1957.

"This dictionary," state the authors in a preface, "is intended as a reference book on current English in the United States. It is de-

signed for people who speak standard English but are uncertain about some details. It attempts to list the questions that most people ask, or should ask, about what is now good practice and to give the best answers available."

Neither as elegant as Fowler, nor as scholarly as Mitford M. Mathews, the Evanses have produced a useful, readable guide to current American usage. This dictionary is a good value and should be helpful both to authors and editors.

Although the authors acknowledge that they have drawn on the *Oxford English Dictionary, A Dictionary of American English, A Dictionary of Americanisms, The American Language* and its supplements, *The American College Dictionary* and other works for information for the individual word entries, much of the commentary is their own and it is good.

A check of several hundred entries is convincing evidence that the Evanses have defined precisely what is current practice in American speech. There are many words which one would like to see added to *A Dictionary of Contemporary American Usage;* but the words that are in this book are well defined.

The binding is adequate, the type size, style and make-up contribute to readability; but the paper is poor.

N. C. Hudson

MEDICAL JURISPRUDENCE AND TOXICOLOGY

By John Glaister, D.Sc., J.P. (Glasgow). Tenth edition. 720 pages with 225 illustrations. $10. Baltimore, Md., Williams & Wilkins Co., 1957.

As far as Americans are concerned, this new edition is a welcome contribution to the medical literature principally because of its masterly treatment of toxicologic problems. Eleven of the 26 chapters are devoted to various aspects of this field, and it is doubtful that one need go further for basic information on the subject.

At the same time, the volume presents in greatest detail all aspects of medical evidence relating to violent death. With the inclusion of numerous descriptive case reports, the reader finds the unraveling of mysterious homocides as exciting as any Sherlock Holmes narrative. Included is appropriate attention to dental investigation as a means of identification. An interesting new method in which a roentgenogram of a severed and mutilated head is compared with a photograph of the suspected victim is described.

Not only are all forms of poisoning considered in the chapters mentioned, but also special tests for their detection are described, as well as physical evidence produced by specific poisons. Chemical tests are contained in a special appendix. In another appendix are data on weights and measures and their conversion, as well as information on weights of organs.

Since its first publication in 1902, this book has been considered an authority in the field of medical jurisprudence and toxicology. The new edition carries on this reputation. There are numerous valuable illustrations, and the type and format are conducive to easy reading.

W. W. Bolton

DENTAL CLINICS OF NORTH AMERICA—PUBLISHED THREE TIMES A YEAR—MARCH, 1958 ISSUE. SYMPOSIUM ON PRACTICAL ORAL THERAPEUTICS

By F. Darl Ostrander, D.D.S., consulting editor, in collaboration with 26 co-authors. 276 pages. Index. $14 yearly subscription. Philadelphia, W. B. Saunders Co., 1958.

The scholarly background of Doctor Ostrander, and his unbiased scientific analysis, are an ideal combination for his function as consulting editor. In his foreword he states, "In no area of dentistry have changes been occurring more rapidly in the past two decades than in the field of dental therapeutics. . . . The subjects which are included in this symposium were chosen primarily on the basis of two criteria—first, they are areas of dental therapy in which recent or current developments have occurred; second, they concern drug groups which have value in the every-day practice of dentistry."

Following the pattern of previous publications of *Dental Clinics of North America,* this edition continues to reflect the concepts of numerous participants. Twenty-seven contributors have prepared 22 monographs for this volume. Teachers, dental students and practitioners will appreciate the editor's efforts in concisely compiling and summarizing useful information on nearly every facet of oral therapeutics. The text is simple and written clearly, with functional allusion to clinical conditions and practical application. The references are adequate and the discussions brief. Significant emphasis is placed on research trends and what the future holds in dental therapeutics. The text is climaxed by a chapter on prescription writing and a classification of drugs according to their therapeutic uses.

Misstatements and typographical errors are at a minimum. However, in one or two in-

stances this reviewer must disagree with a particular author's point of view. These variances are mentioned not so much by way of criticism, but special interest in the specific field this article encompasses.

On page 150, discussing technic of irrigation in the titled article, "Therapeutic Management of Endodontic Infections," the author states: "The peroxide should always be introduced into the canal first, followed by the hypochlorite solution." One not familiar with current clinical procedures in this area could be misled easily by this statement. The purpose of the hypochlorite solution is to disintegrate and dissolve pulp tissue, aside from its germicidal and bleaching action. Peroxide is used subsequently and not previously to neutralize the alkalinity of the hypochlorite solution and to cause effervescence, which in turn will result in expulsion of debris from the canal. If the author's procedure were followed, the hypochlorite solution would be neutralized immediately, and its chemical effect lost completely.

On the following page, under the paragraph headed "Requirements of a Sterilizing Agent," the author states, "In all probability the most important property that a root canal antiseptic must possess, is the ability to destroy all the organisms commonly found in an infected root canal." This statement may be considered a minor error, but the implication is important. An antiseptic agent is one that inhibits growth of organisms without necessarily destroying them. A germicidal agent is one that destroys organisms. Nevertheless, all things considered, this author has done a creditable job.

The book is enthusiastically recommended for reading and study by all dental students and practitioners. The quality of paper, printing, make-up and binding is the same standard as previous editions.

E. Alan Lieban

DENTISTERIE OPÉRATOIRE—TOME II. DENTISTERIE RESTAURATRICE (OPERATIVE DENTISTRY—VOLUME II. RESTORATIVE DENTISTRY)

By A. Marmasse. 556 pages with 720 illustrations. French francs 4,600. Paris, France, J. B. Baillière et Fils, 1958.

Although this is a book written mainly for the benefit of students, the experienced practitioner can use it easily to review the basic principles and modern concepts of cavity preparation. Students will appreciate the part dealing with: (1) the equipment of the dental office directly related to operative dentistry; (2) its use, and (3) the dentist's comfort at the chair as well as the patient's comfort.

The author has covered thoroughly and clearly the subject of cavity preparation principles including the latest technics. Since they are used very little in private practice he minimizes the material on gold foil restorations. All information given on dental materials used in operative dentistry is complete regarding their use, advantages and disadvantages. However, specialized textbooks should be consulted if any more technical information is sought.

Direct impression technics and laboratory procedures are adequately covered, but the general practitioner might be interested in more detailed information regarding the latest indirect impression technics.

Curiously enough, the problem of pain has been somewhat neglected and there is no mention of the use of local anesthesia in operative dentistry.

The author's style, the wide-spaced print, type size and the quality of the paper make this book easy to read. The diagrams are numerous and clear; there are no photographs. It is a must for the practitioner who can read French easily.

George P. Simonet

IMMUNOPATHOLOGIE IN KLINIK UND FORSCHUNG: DAS PROBLEM DER AUTOANTIKÖRPER (IMMUNOPATHOLOGY IN DIAGNOSIS AND RESEARCH: THE PROBLEM OF AUTOANTIBODIES)

By P. Miescher and K. O. Vorlaender. Introductions by P. Martini and O. Gsell. 598 pages with 119 illustrations. Index. DM. 69. Stuttgart, Georg Thieme, 1957.

This textbook on immunology contains contributions by many renowned researchers from Germany, France and Switzerland. The work seems up-to-date and is remarkably free from typographical errors. It is especially good from the immunochemical and immunopathological point of view and provides reasonably detailed information for the dentist or physician who wishes to obtain knowledge in the field of changes and phenomena of immunity, specifically the chemistry of antigens, antibodies and their actions and reactions.

This textbook, however, suffers from the same disadvantages as do practically all American textbooks on immunology, namely, that the subjects are not presented as an integrated, connected entity. A beginner is likely to emerge with the feeling that the science of immunology consists largely of unrelated, isolated observations with little continuity or relation between them.

The treatment of the immunochemical (laboratory) aspect is far more detailed and

better stated than the discussion of the immunopathological (clinical) aspect.

This book, therefore, will only partially fulfill the needs of the dentist or physician who wishes information on the clinical aspects of immunology. Tables and illustrations are excellent. Wisely selected bibliographies accompany each chapter. Paper quality, typography and binding indicate the high quality of German book publishing.

Paul H. Glucksman

ALLERGIE (ALLERGY)

Edited by K. Hansen. Third edition. 1,211 pages with 305 illustrations, some in color. Index. DM.187. Stuttgart, Georg Thieme, 1957.

This textbook on allergy, edited by an outstanding German teacher on allergy and pathology, contains the contribution of prominent Austrian, German and Swiss specialists in the field of hypersensitivity to particular allergens and antigens.

Specific attention is paid to the allergic patients seen in general medical and dental practice. Significant information is given on the role the psyche plays in the afflictions and reactions of these patients. Diagnosis and treatment are discussed.

The authors emphasize that the allergic patient, like any other sick person, can be understood only in the context of his total inherited and environmental situation. Both the allergic condition and the emotional climate of the family are significant factors in the development of local, systemic and eczematous reactions to contact with specific allergens or antigens. Emotional factors often act as trigger mechanisms for the production of symptoms.

The task of diagnosing correctly the various symptoms and reactions in children and adults requires special technical procedures, and treatment is effected by means of particular skills that cannot be acquired by reading.

The entire book is written in comparatively simple, understandable German.

The authors and the editor assert that emotional factors are but a part of the allergic syndrome, and this part is especially well presented.

This book may stimulate practicing dentists and physicians to obtain more training in psychodynamics or to a greater willingness for cooperation with specialists in allergy and psychotherapy.

Printing, binding and illustrations are of the same high quality that characterized the previous editions.

Paul H. Glucksman

A TEXTBOOK OF DENTAL ANATOMY AND PHYSIOLOGY

By Russell C. Wheeler, D.D.S. Third edition. 413 pages with 428 illustrations. Bibliography, glossary, index. $8.50. Philadelphia, W. B. Saunders Co., 1958.

The third edition of *Dental Anatomy and Physiology* will aid the dental student in obtaining the thorough background which is needed, particularly since operative technics have been revolutionized by the extensive use of high speed and new materials. Among the first 12 chapters which are intended for the first year work in dental school is much dental physiology. Interest is greatly stimulated by illustrating practical observations. Chapters 13 through 16 contain material for advanced students and for postgraduate instruction. This edition, more than previously, presents the fundamental form of the teeth, their alignment and their occlusion, which is basic for all phases of dental practice.

The many actual photographs contribute much to the book. The new type face and changes in layout improve the legibility and ease of reading. Legends and illustrations have been spaced to permit continuous reading of the text. The excellent quality of paper give the book an attractive appearance.

In chapter 15 the anatomy of the temporomandibular articulation and the analysis of mandibular movements are well presented.

The arrangement of the teeth and occlusion are particularly well illustrated in chapter 16. The author presents a fine text which will be of great use to the dental profession.

E. O. Butcher

BERGEY'S MANUAL OF DETERMINATIVE BACTERIOLOGY

By Robert S. Breed, E. G. D. Murray and Nathan R. Smith. Seventh edition. 1,094 pages. Index. $15. Philadelphia, Williams & Wilkins Co., 1957.

The present reviewer had the privilege of reviewing the first edition of this book (*D. Cosmos* 66:224, 1924). At that time, a determinative bacteriology to take the place of Chester's (1901) was badly needed; the appearance of seven editions over the years demonstrates conclusively that *Bergey's Manual* met that need. The end of subsequent revisions is not in sight. The book has no competitor in the English language and its availability to all professional bacteriologists is a "must." Only a few dentists may occasionally desire to consult it.

The most obvious change in the seventh edition is that of the separation into two volumes of material comparable to that which appeared in the sixth edition. Volume one of this new edition contains descriptions of many more species and these descriptions are more adequate. Volume two (to be known as the Index Bergeyana) will include all descriptions and citations of species formerly found in appendixes or indefinitely placed as *species incertae sedis*. Volume two will also include a host and habitat index. The transfer of much material to the Index Bergeyana has resulted in a reduction in the number of pages and a book of more convenient size and greater usefulness. The deletion of the classification of viruses is welcome; its appearance in the sixth edition was premature.

The purposes of this manual are the same as the purposes of field books on birds, insects or flowering plants, with which many of us are acquainted. We want primarily to find the name of a specimen new to us. The bacteriologist isolates a bacterium in pure culture (for example, from saliva or an abscess or a periodontal pocket). He studies this culture systematically, and with the information obtained consults "Bergey" to see if someone previously has found a bacterium with essentially the same characteristics and, if so, by what name it is formally known. This permits him to search the literature to learn what already has been found out about this bacterium. Thus, he saves much time in obtaining answers to his questions or in discovering which of his questions probably cannot be answered without further study.

The manual can also be used for the reverse purpose. The name of a bacterium encountered in one's reading can be sought in the index; if found, reference can be made to a concise summary of the characteristics of the bacterium. The organization of the manual in itself attempts to reveal widely current views about the biologic relationships of bacteria.

It is disappointing to find no discussion in this book of a question such as: is the bacterial species the conceptual equivalent of the species of such forms as insects, birds, or man? "The essence of a biological species concept is discontinuity due to reproductive isolation. Without sexuality this concept cannot be applied. Asexuality then is the most formidable and most fundamental obstacle of a biological species concept." (Ernst Mayr, The species problem, American Association for the Advancement of Science, publication 50, p. 379, 1957.) At the time of the appearance of the first edition of *Bergey's Manual*, the "asexuality" of the bacteria would indeed have been a formidable obstacle. However, current thinking indicates that this obstacle is fast fading. "We can distinguish at least 3 modes of genetic transfer in bacteria. . . . First, deoxyribonucleic acid can carry genetic information from a donor cell to a recipient into which it is incorporated without any known intermediary in the transfer. Second [bacterio] phage can act as a carrier of genetic information from a donor in which it has developed, to a recipient susceptible to it. Third, conjugation can occur between 2 cells with exchange of nuclear material. . . ." (L. L. Cavalli-Sforza, Bacterial genetics. *Annual Review of Microbiology* 11:391 1957.)

The application of this viewpoint would show the inappropriateness of using "specific" names for the large number of distinguishable strains found in many genera, conspicuous among which is Salmonella. By the time the eighth edition appears, perhaps cognizance will have been taken of the facts of the genetics of bacterial populations.

J. L. T. Appleton

CLINICAL PERIODONTOLOGY

By Irving Glickman. Second edition. 978 pages with 720 illustrations. Index. $17.50. Philadelphia, W. B. Saunders Co., 1958.

Since 1953, when this textbook was first published, the student, general practitioner and the periodontist alike have gleaned valuable information from the material presented. In this second edition, the author still maintains his avowed conviction that the periodontal care of the American public must rest primarily in the hands of the general practitioner.

To promote this purpose even more effectively, revision of the text emphasizes the section dealing with clinical management of periodontal disease; it has been enlarged and reorganized into five parts. The author has incorporated all details of periodontal disease with clear and concise description which is easy and interesting to read.

The illustrations are well organized and plainly captioned. This type of textbook, with an excellent reference list brought up to date at the conclusion of each chapter, is convenient for those who wish to add to their knowledge of the subject. The author has, in a single volume, provided the dental profession with a comprehensive, down to earth why and how reference to which the student and the practitioner may turn to improve their knowledge and skill in better preserving the supporting structures of the teeth.

E. A. Archer

Current Literature

APPLICATION OF THE RUBBER DAM IN THE PRE-SCHOOL CHILD

Paul Starkey. J. Den. Children 24:230 Fourth Quarter 1957.

Using the rubber dam has many advantages, but efforts to encourage its use generally meet with arguments.

The rubber dam especially is indicated in a practice limited to children where three fourths are of preschool age. Placing the dam tends to relax the child, reduce operating time to one half, and improve the quality of dentistry. The application and reason for using the dam is explained to the child.

The armamentarium consists of a 5 by 5 inch sheet of rubber dam material, a rubber dam punch, forceps, an Ivory no. 3 rubber dam clamp, and a Young's rubber dam frame.

A technic for application of the rubber dam for restoration of the occlusal aspect of a lower second deciduous molar is described and illustrated. Also the use of the rubber dam in isolating the lower first and second deciduous molars for a mesiooccIusal amalgam restoration on the second, and distoocclusal amalgam restoration on the first, molar is discussed and the advantages related.

Other applications of the dam described are in the maxillary anterior teeth when silicates are placed, for restorations on the second deciduous molars where the first deciduous molar is to be extracted at the same sitting, and on partially erupted six-year molars.

It is hoped that this paper will influence dentists who treat children to try the rubber dam again.

John Sanders Pike

TEACHING OF HYPNOSIS

J.A.M.A. 166:2242 April 26, 1958.

Q.—Please give information on an ethical manner for teaching of hypnosis.

A.—Any course dealing with hypnotic technics should not stress primarily the induction of hypnosis, since this is a relatively simple matter which requires little technical skill and little training. Some work on what best can be termed the motivational bases of human behavior seems to be a prerequisite. Any training should include not only technics of induction but also indications and limitations for its use within the specific area involved.

Precautions and potential dangers should be stressed. All such training should be under responsible medical or dental direction. Any use of hypnotic technics should be for purposes within the area of one's specific specialty or usual practice and should not be beyond the range of ordinary competence.

A NEW TREATMENT OF "DRY SOCKET"

Sir William Kelsey and Victor Goldman. Brit. D. J. 104:55 Jan. 21, 1958.

Preliminary studies with a new medicament indicate that it is effective in the treatment of septic alveolus.

First, the socket must be syringed, preferably with a large quantity of fluid. Second, some therapeutic substance should be inserted into the socket to relieve pain and promote healing while the orifice of the socket closes.

A suitable base or vehicle for the medicament used in the second step is polythene because of its easy workability and the fact that it stays in the alveolus. Using this base, a blind investigation was undertaken to determine what active constituents were most effective in relieving pain. After six months the formula, Biosone G. A. Dental Paste, proved most effective.

The formula contains glycyrrhetinic acid which is a powerful anti-inflammatory agent that assists in organization and healing. It combines with three analgesic agents and potentiates the combined analgesic action. The formula also contains neomycin sulfate.

Biosone G. A. Dental Paste has the consistency of plastic modeling clay, and a small piece may be rolled and inserted into the socket, where it will remain for 24 to 48 hours. It gives almost immediate relief from pain (in less than one hour). In severe cases, a second pack may be placed after 24 hours.

D. C. Zimmerman

THE NEED FOR MOTIVATION RESEARCH IN DENTISTRY

Dennis Bullen. J. Canad. D. A. 24:71 Feb. 1958.

The demand for dental service of a clinical nature has never been greater, and may be expected to increase. On the other hand there is little demand for guidance in the prevention of dental disease. This widespread failure in the application of known preventive measures indicates an urgent need for study of the psychological factors governing public acceptance of dental health teaching. The need

is great for understanding the motivational factors governing dental practice, so that the efforts of the profession to improve public health may be more effective.

Some aspects of dental practice which can be examined in relation to the emotional factors are: (1) psychological factors of pain as related to anxiety and apprehension are the ever-present problem to both patient and dentist; (2) knowledge of dental hygiene and diet habits is not enough; there is a need to motivate the patients to action; (3) public health dentists are a great help in educating the public, but the public needs to be persuaded before it will accept some of the principles of prevention, such as fluoridation of drinking water; in order to persuade the motivational factors involved must be studied; (4) in initiating treatment periodontists need to know the factors which influence the patient to accept or reject the therapy, and (5) a powerful force in the community acceptance of dental health teaching can be the example set by the dentist and his family.

The need is great for understanding of the motivational factors governing dental practice, so that the efforts of the professional to improve public health may be more effective. This understanding may be gained by:

1. The study of psychology and social sciences.
2. Study clubs for motivation research.
3. Active cooperation between university faculties of dentistry and departments of psychology.
4. Encouragement of postgraduate theses in this field.

Leon B. Sowell

A CEPHALOMETRIC AND HISTOLOGIC STUDY OF THE EFFECT OF ORTHODONTIC EXPANSION OF THE MIDPALATAL SUTURE OF THE CAT

Edgard F. Debbane. Am.J.Orthodont. 44:187 March 1958.

In present orthodontic thinking concerning the effect of orthodontic expansion in the maxillary facial region, two schools of thought seem to prevail.

One school contends that in the usual type of orthodontic treatment any expansion of the maxillary dental arch is confined to the teeth and the alveolar bone immediately surrounding them.

The other school of thought, primarily propounded by prominent European orthodontists, expresses the concept that expansion forces can open and widen the midpalatal suture of the maxillary facial complex. The opening of the maxillary palatal suture is thought to encourage the apposition of new bone in the suture area.

Different types of orthodontic forces were applied directly on the maxillary canine teeth of fully grown cats in order to study the effect of those forces on the maxillary midpalatal suture. In this investigation nine cats were studied. They were divided into four groups. The three cats in the control group were not subjected to any orthodontic forces. The other three groups, each composed of two cats, were respectively subjected to intermittent expansion forces, continuous expansion forces, and intermittent contraction forces.

In both the expansion and the contraction groups, the superimposed cephalometric tracings showed no growth changes during the period of treatment. Cephalometric tracings superimposed on the palatal contour indicated a tipping of the premaxillary bone after orthodontic expansion and contraction.

After the application of orthodontic expansion forces, the maxillary midpalatal suture was opened. The degree of opening was not the same throughout the length of the suture.

The opening of the midpalatal suture was accompanied by a formation of new bone at both edges of the two palatal plates bordering the suture.

Concomitant with the opening of the midpalatal suture, there was evidence of traumatic injury characterized by dilatation of the blood vessels, as well as edema with evidence of disorganized connective tissue in the palatal mucosa and the midpalatal suture. It is suggested that the degree of force or the amount of expansion, or both, was excessive in the case of the experimental animals used.

The results of this study suggest that future investigation of these subjects might be fruitfully pursued. Further studies are required so that findings may be conclusively applied to orthodontic treatment procedures in human beings.

William F. Ford

THE IMPACT OF ULTRA-HIGH SPEED ON THE DENTAL PROFESSION

James D. Purves. J. Canad. D.A. 24:69 Feb. 1958.

The field of restorative dentistry has been raised to a new plateau by the introduction of ultra-high speed equipment such as the air turbine. With its use several pertinent implications become evident. The first is that the pressure-touch system employed with the conventional handpiece is replaced with a completely visual system. Adequate light and ex-

cellent vision are necessary requisites when an air turbine is used.

The length of time required for a given operation is reduced and the dentist finds that he is ahead of his operating schedule. The dentist might adjust to this situation in one of the following ways: (1) more time may be devoted to the restorative phase in creating a more desirable restoration; (2) the dentist may use this time to relax and make his schedule more enjoyable, healthful, and workable, and (3) the dentist may increase an already heavy burden by seeing more patients.

Since a greater service per unit time is accomplished, the patient will want to benefit by appropriate adjustment of dental fees. There are many inconsistencies and inadequacies in the "fee per surface filling." The fee per hour rate can be introduced into practice with the ultra-high speed turbine. This principle, adjusted when necessary according to the difficulty of the operation and the skill necessary to provide that service, helps establish more realistic fees to the mutual advantage of dentist and patient.

Most operative procedures may be accomplished with ultra-high speed equipment, but there are some contraindications: (1) any operative field which cannot be brought into full view; (2) small Class III gold foil and silicate cavity preparations; (3) lingual cavities on lower molars; (4) Class V cavities; (5) the removal of soft decay, and (6) any region where good sense suggests the use of a slower speed.

Felix F. Woycheshin

THE INTEGUMENTAL PROFILE

Charles J. Burstone. Am.J.Orthodont. 44:1 Jan. 1958.

The average morphology and variation of acceptable profiles are described, based on the Herron sample (a group of good faces picked by a panel of artists). The hypothesis is explored that average inclination, contour, and proportion are related to profile excellence.

Graphic comparison to the Herron sample by use of the integumental profile grid expedites the analysis of malocclusion deformity and the study of soft tissue changes occurring during growth treatment.

A method of direct integumental analysis is presented, employing angular readings that describe profile components to the skull as a whole (inclination angles) and to each other (contour angles). These readings are made from oriented lateral headplates exposed to show both hard and soft tissue detail.

Modern orthodontics implies not only occlusal excellence, but also the positioning of teeth to produce optimal facial harmony for the individual patient. The soft tissue veneer covering the teeth and bone varies so greatly that study of the dentoskeletal pattern may be inadequate in evaluating facial disharmony.

William F. Ford

THE PERITUBULAR TRANSLUCENT ZONES IN HUMAN DENTINE

G. C. Blake. Brit. D. J. 104:57 Jan. 21, 1958.

This study was undertaken in order to gain more knowledge of the nature of the peritubular translucent zones in human dentin. A method has been described by which frozen sections of incompletely decalcified teeth may be prepared free of the shrinkage that occurs during paraffin embedding. This procedure allowed for a direct comparison of the translucent zones before and after decalcification. By staining with Schmorl's picrothionin method, it was confirmed that the peritubular translucent zones seen in ground sections of dentin are not found in decalcified sections. This would indicate that the apparent dentinal tubulae included at one time the former translucent zone.

By microradiographic and histological studies of undecalcified tooth sections through interglobular spaces and through the dentin near the pulp, it was found that the translucent zone forms after the calcification of the collagen matrix. The findings suggest that the translucent zone formation is a process of calcification in a noncollagenous matrix brought about by a possible odontoblastic activity. The suggestion is made that the first formed tubule in the collagen matrix be termed the "primary dentinal tubule."

Paul R. Thomassen

REACTIVE TOOTH POSITIONING

Ira Franklin Ross. Oral Surg., Oral Med. & Oral Path. 10:725 July 1957.

Certain deviations in tooth position may be inherent. These can be accepted within normal limits when considering the individual. However, malposed teeth may align themselves if certain insulting influences are removed, hence the term "reactive positioning" has been justly applied.

That teeth may be moved by bite planes, steel ligatures and rubber dam elastics is a clinical fact. Reactive or endogenous tooth movement must be considered of equal importance. Careful removal of certain etiological agents such as abnormal inclined plane

relations and inevitable soft tissue collapse may lead to better alignment of teeth.

A critical appraisal must reveal adequate space to reposition the malposed tooth. Elongated cusps as well as blocked cusps must be dealt with. The reshaped tooth must not be devoid of all of its outer structure. Varying degrees of reactive positioning will follow; the all-or-none law need not apply.

Clinical illustrations have been shown to justify the approach. Careful case analysis and treatment planning will enhance the integrity of the stomatognathic system.

George S. Kendrick

ORAL AMYLOID AS A COMPLICATION OF MYELOMATOSIS

Lester Cahn. Oral Surg., Oral Med. & Oral Path. 10:735 July 1957.

There are two major types of amyloid—a primary variety and a secondary type. The two are different both in staining properties and in distribution. Secondary amyloid is found in the spleen, liver, blood vessels and adrenals whereas the primary type infiltrates the mesodermal tissues of the blood vessels, heart, skeletal muscles, synovia, mouth and the tongue. Amyloid deposition is a complication of myelomatosis according to Apitz's theory and in five patients, deposits of amyloid in the tongue and buccal mucosa were the first clinical signs of myelomatosis. These patients complained of sore mouths, but evidence of frank bone lesions, hyperglobulinemia and elevated total serum protein was absent at this time. With the progression of myelomatosis, sternal puncture showed myeloma cells and electrophoresis revealed increased levels of alpha and beta globulins. Here is another oral sign of a systemic disease for which the dentist may well be the first one consulted.

Eugene R. Zimmermann

THE RELATIONSHIP OF ORAL EXAMINATION TO DENTAL DIAGNOSIS

M. M. House. J. Pros. Den. 8:208 March 1958.

Dentistry can be of greater value as a health service if the dental examination includes a systematic study of the teeth, jaws and oral structures. A complete dental history includes the extent of previous dental ailments, reasons for tooth loss, recuperative powers, reactions to anesthetics, dental prejudices and the chief present complaints.

The visual examination includes both the extraoral and intraoral aspects, paying special attention to soft tissue abnormalities. An explorer is used to test all exposed tooth surfaces and to check for serumal deposits. Study casts are useful in noting many conditions not readily seen in direct examination and are important from the standpoint of replacement design.

The importance of roentgenograms is to be emphasized for edentulous patients as well as for those with teeth. Many conditions may be revealed which require correction before prosthetic work is undertaken.

Transillumination tests and vitality tests are of value in diagnosis, and conclusions reached in the dental examination will occasionally call for medical consultation and laboratory tests.

Examination of the edentulous mouth should stress the importance of biologic conditions, covering muscle tone and development, bony structure, ridge form and relation, and soft tissue forms. Proper interpretation of these findings will determine the subsequent mechanical procedures to be used and the prognosis.

There are no short cuts in the dental examination and no single diagnostic medium should be made the sole basis for a diagnosis. A complete and thorough study must always precede the treatment plan.

Rinert Gerhard

SOME ALVEOLAR BONE FINDINGS IN HOSPITALIZED PATIENTS

Carl Blacharsh, Daniel Staub and Reuben Margolis. J. Periodont. 29:53 Jan. 1958.

The lowering of general health in an individual increases susceptibility to periodontal disease; also, there is a correlation between anxiety states and periodontal involvements. This study investigates systemic and emotional illnesses as stress factors on the alveolar bone.

Roentgenograms from 169 hospitalized male patients between 20 and 49 years of age were examined for lamina dura at the alveolar crest, the ratio between the alveolar crest level and root length, and the rate of resorption. The investigators examined mesial and distal surfaces of the cuspids, central incisors and molars in each complete roentgenogram, with no knowledge of the patient's age or general health. After examination of the roentgenogram and notation of the changes in the alveolar process, the patient's age and hospital record were obtained. The patients were then divided into age and disease groups. Those who were hospitalized for reasons other than systemic diseases, such as fractures, were used as controls.

The medical group had an alveolar bone

loss similar to the control groups and both showed an increase in loss of bone with age. No correlation could be found between the loss of lamina dura and diagnostic grouping.

The results of this study indicate that age is a more important factor in alveolar bone loss than some systemic involvement. This does not minimize systemic disease as an etiological factor, but the effects of systemic disease on alveolar bone are not always predictable.

Henry M. Swenson

SOME RADIATION HAZARDS OF DENTAL X-RAY AND THEIR ELIMINATION

Elmer A. Lee. J. California D. A. 34:14 Jan.-Feb. 1958.

Unrest on the part of the general public about the amount of x-ray exposure has resulted from articles in the lay press quoting exposures of over 300 roentgens for full mouth roentgenographic examinations. Insurance rates for malpractice liability have increased 10 to 50 per cent for dentists, and the most recent record claims are from diagnostic procedures. The incidence of leukemia is 18 times higher in physicians exposed to moderate amounts of radiation and animal experimentation reveals that longevity is indirectly proportional to radiation exposure. The dentist, therefore, should operate his x-ray equipment in the safest manner possible for protection of his patients and himself.

Simple methods of reducing the amount of radiation are the use of filters, long cones, higher kilovoltage, greater distance between patient and x-ray unit, accurate timers and a stable current source. Additional methods include the employment of faster films, use of well-tested technics, and fresh, well-mixed chemicals.

These few minor alterations will reduce the output of the dental x-ray unit to safe levels. Use of all of the modern advantages in dental roentgenography can produce a full set of roentgenograms with no more than 5 r of exposure.

Theodore S. Grant

A METHOD OF REDUCTION FOR IMPACTED AND PARTIALLY MALUNITED FRACTURES OF THE JAWS

Richard J. Burch, Thomas S. Shuttee and Edward C. Funk. J. Oral Surg. 16:336 July 1958.

Technics for the reduction and fixation of horizontal maxillary fractures of the Guerin (through the maxillary sinus and nose) and the La Fort (through the orbit, malar, and nasal bones) types have been varied and numerous. The majority of these methods are difficult to apply, time-consuming and uncomfortable to the patient.

The main problem in the management of the fractures is the restoration of the patient's pretraumatic occlusion. Once this is achieved and secure intermaxillary fixation applied, it is seldom necessary to devise a method for fixing the maxilla to the skull. This is particularly true when initial repositioning is delayed until initial fibrosis has formed, 10 to 14 days after injury.

A simple and efficient method for reduction of horizontal fractures of the maxilla is described in a case report. This procedure is especially useful when the middle third is impacted or when there is a malposition of the maxilla with partial union. The technic includes the following steps:

1. The fabrication of a maxillary arch bar with a small loop in the region of the central incisors.
2. Application of the arch bar to the maxillary teeth.
3. Erection of a Balkan frame on the patient's bed.
4. Attachment of a one pound weight, by elastics, to the loop on the maxillary arch bar and its suspension from the Balkan frame.
5. Changing of the direction of the traction by the positioning of the patient's head.

Once the maxilla has been advanced sufficiently, intermaxillary elastics can be applied to complete the reduction.

Concurrent mandibular fractures are reduced by open reduction and transosseous fixation as the initial procedure and the mandible then utilized as a positioning base for the maxilla, 10 to 14 days after initial injury.

SOME ILLUSORY PHENOMENA OF IMPORTANCE IN ORTHODONTICS

Donald C. MacEwan. Am.J.Orthodont. 44:46 Jan. 1958.

An illusion is defined as: "An impression from experience which does not correctly represent the objective situation outside the observer."

If the practicing orthodontist were to avoid the consequences of all undesirable illusions he would spend an inordinate amount of time measuring, checking symmetry, and so forth. By developing an "illusion-mindedness," he can avoid many errors of judgment.

On the other hand, he may wish to create desirable illusions. This subject in its application to orthodontics requires further investigation.

William F. Ford

Deaths

Allen, Edward J., Seattle; Chicago College of Dental Surgery, 1896; died May 29; age 83.

Altus, Maurice S., Chicago; University of Pittsburgh School of Dentistry, 1926; died July 9; age 54.

Ament, Richard D., Fort Lauderdale, Fla.; University of Michigan School of Dentistry, 1925; died June 23; age 57.

Anderson, Gilbert G., Wausau, Wis.; Wisconsin College of Dentistry Department of Carroll College, 1909; died June 8; age 79.

Anderson, John W., San Gabriel, Calif.; University of Minnesota School of Dentistry, 1930; died August 3.

Babbidge, Douglass P., Brooklyn; Tufts College Dental School, 1927; died July 24; age 57.

Bacheler, Otis D., Buzzards Bay, Mass.; University of Maryland, Dental Department, 1910; died June 7; age 77.

Baggott, Vincent J., Providence, R. I.; Philadelphia Dental College, 1892; died August 3; age 88.

Barrow, Blendon C., Pensacola, Fla.; Vanderbilt University School of Dentistry, 1925; died July 4; age 56.

Baumbach, Herbert A., Menomonie, Wis.; Marquette University Dental School, 1916; died February 11; age 64.

Beal, M. Clay, Poughkeepsie, N. Y.; University of Pennsylvania School of Dentistry, 1916; died June 18; age 63.

Bedell, Everett W., St. Louis; Washington University School of Dentistry, 1917; died May 5; age 62.

Bernhardt, Walter J., Rochester, N. Y.; University of Pennsylvania School of Dentistry, 1918; died July 26; age 65.

Blosser, Elbert E., Exeter, Calif.; College of Physicians and Surgeons, San Francisco, 1904; died July 29; age 83.

Boone, Harry W., Champaign, Ill.; Indiana Dental College, 1901; died July 2; age 82.

Brady, Leo R., Union, N. Y.; University of Pennsylvania School of Dentistry, 1915; died June 7; age 65.

Brame, Paul H., Windsor, Mo.; died June 6; age 79.

Brooks, Anthony Wayne, Muncie, Ind.; Northwestern University Dental School, 1915; died July 26; age 69.

Brownfield, Leslie W., Uniontown, Pa.; Pittsburgh Dental College, Western University of Pennsylvania, 1902; died July 25; age 78.

Bryans, Harry S., Toronto, Canada; Royal College of Dental Surgeons, School of Dentistry, Toronto, 1921; died March 24; age 59.

Buchanan, James L., Wray, Colo.; Pittsburgh Dental College Western University of Pennsylvania, 1906; died June 29; age 76.

Burke, William R., Providence, R. I.; University of Maryland Dental Department, 1907; died June 12; age 74.

Call, James J., Ely, Minn.; Louisville College of Dentistry, 1917; died July 20; age 63.

Cameron, William J., Des Moines, Iowa; University of Iowa College of Dentistry, 1901; died June 20; age 81.

Carle, Nellie M., Wilkes-Barre, Pa.; Philadelphia Dental College, 1894; died June 2; age 92.

Carlson, Walter C., St. Paul; University of Minnesota School of Dentistry, 1924; died June 15; age 60.

Carnicelli, Anthony J., Auburn, N. Y.; Georgetown University School of Dentistry, 1935; died April 23; age 53.

Cart, Jacob F., Peoria, Ill.; Northwestern University Dental School, 1917; died April 6; age 69.

Cays, Egerton B., Oswego, N. Y.; University of Buffalo School of Dentistry, 1898; died July 8; age 80.

Clapp, George W., New Rochelle, N. Y.; University of Michigan School of Dentistry, 1900; died August 8; age 87.

Clark, Robert H., Brooklyn; George Washington University Dental Department, Washington, D. C., 1908; died June 30; age 81.

Clark, W. Edward, Augusta, Ga.; Atlanta Dental College, 1910; died February 18; age 73.

Cochran, Roy J., Pleasant Hope, Mo.; Western Dental College, 1909; died May 30; age 74.

Cooper, William M., Tulsa, Okla.; St. Louis University School of Dentistry, 1916; died June 19; age 67.

Corcoran, A. Joseph, New York; University of Buffalo School of Dentistry, 1922; died June 6; age 60.

Cosier, Peter C., Millville, N. J.; Temple University School of Dentistry, 1945; died June 7; age 36.

Costanza, Emil L., Elizabeth, N. J.; Baltimore College of Dental Surgery, University of Maryland, 1928; died July 24; age 52.

Costello, Thomas W., Everett, Wash.; North Pacific College of Oregon School of Dentistry, 1918; died June 15; age 62.

Coverley, William E., New York; University of Illinois College of Dentistry, 1914; died April 27; age 66.

Craig, Gilbert T., Wallingford, Conn.; Baltimore College of Dental Surgery, University of Maryland, 1928; died March 2; age 58.

Cross, Clyde V., Lincoln, Neb.; died June 30; age 78.

Crowley, Louis A., Whitman, Mass.; Tufts College Dental School, 1923; died July 29; age 56.

Currie, Alexander W., Mount Vernon, N. Y.; New York College of Dentistry, 1897; died June 3; age 87.

Curry, Oscar W., Herrin, Ill.; Indiana Dental College, 1901; died June 2; age 82.

Davis, Harold W., Phoenix, Ariz.; died June 7; age 58.

Davis, Oscar E., Charleston, W. Va.; Howard University College of Dentistry, 1914; died July 28; age 70.

Dean, Walter F., Indianapolis; Indiana Dental College, 1914; died July 29; age 68.

Delp, Coy M., Mount Jackson, Va.; Medical College of Virginia School of Dentistry, 1923; died June 11; age 60.

DeWaters, Robert S., Pittsburgh; University of Pittsburgh School of Dentistry, 1926; died June 11; age 56.

Dolowit, Maurice A., Newark, N. J.; Baltimore Medical College, Dental Department, 1908; died July 20; age 72.

Donavan, Robert J., Mason City, Ill.; St. Louis University School of Dentistry, 1924; died June 7; age 62.

Downie, Charles E. W., Pomeroy, Ohio; Ohio Medical University College of Dentistry, 1899; died June 23; age 79.

Duffy, Philip A., East Greenwich, R. I.; Tufts College Dental School, 1916; died June 2; age 62.

Duxbury, Russell K., New York; University of Pennsylvania School of Dentistry, 1916; died June 12; age 72.

Eichner, Herbert J., New York; New York College of Dentistry, 1918; died April 27; age 60.

Elsberg, Maximilian S., Brooklyn; New York College of Dentistry, 1923; died July 13; age 60.

Eskin, Albert C., Cumberland, Md.; Baltimore College of Dental Surgery, University of Maryland, 1931; died June 25; age 50.

Farber, Isaac, New York; College of Dental and Oral Surgery, New York, 1918; died May 9; age 69.

Feilschmidt, Henry G., Chicago; Loyola University School of Dentistry, New Orleans, 1927; died July 6; age 58.

Ferrell, William D., Nashville, Tenn.; University of Tennessee College of Dentistry, 1902; died June 26; age 82.

Field, Arnold B., New York; died May 27.

Fine, Harry, Irvington, N. J.; University of Maryland Dental Department, 1919; died June 28; age 59.

First, Jerome J., Roslyn Heights, L. I., N. Y.; New York University College of Dentistry, 1927; died June 29; age 55.

Forbes, Marcellus M., Atlanta, Ga.; Southern Dental College, 1910; died June 10; age 78.

Fox, Thomas S., Columbus, Ohio; Starling-Ohio Medical College Department of Dentistry, 1911; died July 17; age 70.

Frush, Roy C., Adel, Iowa; Drake University College of Dentistry, 1903; died April 13; age 79.

Furrow, Charles A., Tulsa, Okla.; Kansas City Dental College, 1912; died July 15; age 74.

Garland, James A., Mystic, Conn.; Baltimore College of Dental Surgery, University of Maryland, 1902; died July 28; age 87.

Geiger, William C., Cincinnati; Ohio College of Dental Surgery, University of Cincinnati, 1899; died July 22; age 83.

Geller, Maurice, New York; New York College of Dentistry, 1919; died June 10; age 60.

Goodfriend, Ervin I., San Diego, Calif.; University of Illinois College of Dentistry, 1921; died Aug. 1; age 58.

Gorman, Andrew J., Brockton, Mass.; Tufts College Dental School, 1921; died June 22; age 59.

Gould, Myron N., Tuckahoe, N. Y.; died June 9.

Grissinger, Charles R., Somerset, Pa.; Philadelphia Dental College, 1905; died August 5; age 75.

Grose, Henry B., Augusta, Ga.; Atlanta-Southern Dental College, 1919; died June 3; age 63.

Hair, Lill G., Fayetteville, N. C.; Atlanta Dental College, 1911; died June 13; age 74.

Hale, Frank A., Tipp City, Ohio; Ohio College of Dental Surgery, University of Cincinnati 1909; died July 17; age 80.

Hall, Warren R., Norfolk, Neb.; Creighton University College of Dentistry, 1909; died June 2; age 74.

Handy, George S., Natchez, Miss.; University of Maryland Dental Department, 1901; died July 14; age 79.

Hanley, Ambrose L., Boston; Tufts College Dental School, 1907; died June 23; age 72.

Hansen, Carl E., Port Huron, Mich.; Chicago College of Dental Surgery, 1926; died July 6; age 57.

Harlan, Walter L., Des Moines, Iowa; Des Moines College of Dental Surgery, 1900; died March 23; age 75.

Harper, Alfred J., Onarga, Ill.; Northwestern University Dental School, 1905; died June 3; age 80.

Harrell, Paul T., Wake Forest, N. C.; Medical College of Virginia School of Dentistry, 1939; died July 5; age 43.

Harrison, J. Rollin, Marshalltown, Iowa; University of Iowa College of Dentistry, 1912; died May 5; age 80.

Hart, John H., Bethlehem, Pa.; Medico Chirurgical College of Philadelphia, 1904; died July 12; age 85.

Haynen, Arthur H., Glens Falls, N. Y.; Pennsylvania College of Dentistry, 1901; died August 5; age 80.

Heape, Arthur W., Pittsburgh; University of Pittsburgh School of Dentistry, 1911; died June 10; age 71.

Heiple, Harold H., Waterloo, Iowa; Chicago College of Dental Surgery, 1907; died May 14; age 74.

Herke, Oliver L., Cleveland; Western Reserve University School of Dentistry, 1916; died August 5; age 66.

Herndon, John B., Milledgeville, Ga.; Atlanta-Southern Dental College, 1927; died July 6; age 55.

Hesser, Robert L., Frankford, Mo.; St. Louis University School of Dentistry, 1903; died May 15; age 78.

Hevesh, Joseph, Brooklyn; University of Illinois College of Dentistry, 1923; died June 11; age 77.

Hite, Ova E., Charleston, Ill.; Indiana Dental College, 1909; died April 8; age 73.

Holt, Ernest M., Versailles, Mo.; died July 16; age 79.

Houghtaling, Walter C., Great Barrington, Mass.; died March 3; age 82.

Howes, Ralph R., Forest City, N. C.; Tufts College Dental School, 1924; died June 7; age 61.

Hoy, Harvey H., Shannon, Ill.; Chicago College of Dental Surgery, 1909; died July 31; age 72.

Huffman, James William, Lexington, Ky.; died June 16; age 85.

Husted, Milton E., North Bergen, N. J.; University of Pennsylvania School of Dentistry, 1916; died August 6; age 69.

Irby, John P., Jr., Blackstone, Va.; Vanderbilt University School of Dentistry, 1911; died July 14; age 68.

Jacobson, Ray A., Fargo, N. D.; University of Minnesota School of Dentistry, 1920; died June 9; age 61.

Jakobsen, Olav, Seattle; University of Kansas City School of Dentistry, 1952; died June 14; age 33.

Johnson, Herbert A., St. Joseph, Mo.; Western Dental College, 1914; died June 12; age 79.

Kahan, Aaron A., Spivak, Colo.; University of Denver School of Dentistry, 1913; died June 25; age 80.

Kelly, John C., Plattsburgh, N. Y.; McGill University Faculty of Dentistry, Montreal, Quebec, Canada, 1941; died June 23; age 43.

Kendrick, Melville A., Port Huron, Mich., University of Michigan School of Dentistry, 1900; died June 30; age 83.

Kennedy, Henry G., Hampshire, Tenn.; Vanderbilt University School of Dentistry, 1913; died May 1; age 68.

Kennedy, Lon Verner, Corydon, Ky.; Vanderbilt University School of Dentistry, 1908; died July 16; age 80.

King, Marshall R., Milwaukee; Marquette University Dental School, 1931; died June 25; age 54.

Kirkhoff, Harris S., Eau Claire, Wis.; Marquette University Dental School, 1926; died July 24; age 58.

Kirtley, Lewis W., Indianapolis; Indiana Dental College, 1897; died June 8; age 87.

Klein, Alexander, New York; University of Pittsburgh School of Dentistry, 1941; died July 31; age 70.

Kleinecke, Louis C., Cuero, Texas; Northwestern University Dental School, 1902; died April 30; age 89.

Knight, Lewis F., Simpson, Kan.; died May 4; age 89.

Knowles, Walter L., Indianapolis; Indiana University School of Dentistry, 1902; died June 23; age 82.

Krippene, Benjamin T., Stoughton, Wis.; Marquette University Dental School, 1952; died June 8; age 31.

Lapsley, Paul M., Indiana, Pa.; University of Pittsburgh School of Dentistry, 1926; died July 29; age 53.

Lavine, Harold H., Hyattsville, Md.; Baltimore College of Dental Surgery, University of Maryland, 1937; died July 28; age 58.

Liddell, George G., Pittsburgh; University of Pittsburgh School of Dentistry, 1935; died June 19; age 46.

Linn, Jesse A., Los Angeles; University of California College of Dentistry, 1919; died July 23; age 63.

Linn, Oliver R., Minneapolis; Northwestern University Dental School, 1912; died January 25; age 69.

Macom, William J., New Brunswick, N. J.; New York College of Dentistry, 1890; died July 8; age 89.

Maher, Carroll F., Bloomingdale, N. J.; Temple University School of Dentistry, 1916; died June 24; age 64.

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THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION
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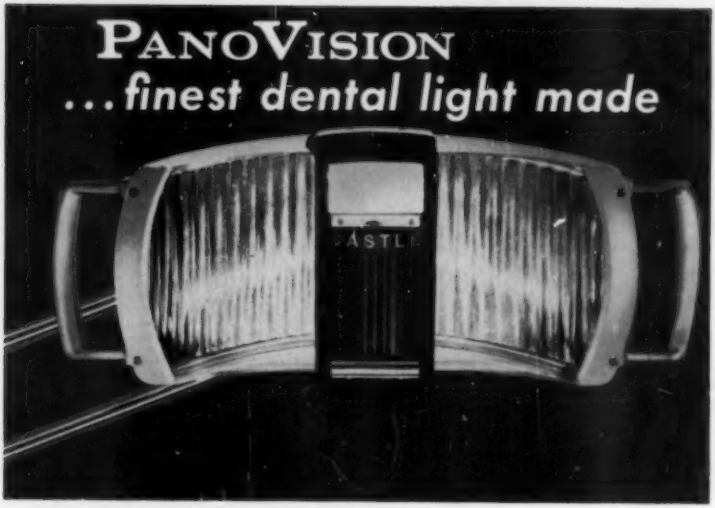
Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

One-Hundredth Annual Session	September 14-18, 1959	New York
One-Hundred and First Annual Session	October 17-20, 1960	Los Angeles
One-Hundred and Second Annual Session	October 16-19, 1961	Philadelphia
One-Hundred and Third Annual Session	October 29-November 1, 1962	Miami Beach, Fla.
One-Hundred and Fourth Annual Session	October 14-17, 1963	Atlantic City, N. J.

MEETINGS OF CONSTITUENT SOCIETIES

State	*Date*	*Place*	*Secretary and Address*
Alabama	Apr. 19-22	Birmingham	C. R. Crook, Professional Center, Montgomery
Alaska	July 13-15	Anchorage	R. D. Livie, 500 K St., Anchorage
Arizona	May 6-9	Scottsdale	W. G. Burke, 15 E. Monroe St., Phoenix
Arkansas	Apr. 12-15	Little Rock	D. M. Hamm, Box 89, Clarksville
California	Apr. 20-22	San Francisco	W. J. Healy, 518 Sutter St., San Francisco 8
S. California	May 4-6	Los Angeles	S. M. Silverman, 903 Crenshaw Blvd., Los Angeles 19
Colorado	Oct. 4-7	Colorado Springs	G. H. Siersma, 724 Republic Bldg., Denver 2
Connecticut	May 13, 14	Hartford	E. S. Arnold, 37 Linnard Rd., W. Hartford
Delaware	June 12, 13	Wilmington	E. J. Truono, 1102 S. Broom St., Wilmington 6
Dist. of Columbia	Mar. 15-18	Washington	J. F. Keaveny, 1835 Eye St., N.W., Washington 6
Florida	May 17-20	Hollywood	R. P. Groom, 3127 Atlantic Blvd., Jacksonville
Georgia	Oct. 25-28	Atlanta	F. M. Butler, Jr., Bankers Insurance Bldg., Macon
Hawaii	June 14-18	Honolulu	J. H. Dawe, 810 N. Vineyard St., Honolulu
Idaho	June 22-24	McCall	J. R. Olesberg, 214 Third St., Coeur d'Alene
Illinois	May 11-13	Peoria	P. W. Clopper, 632 Jefferson Bldg., Peoria
Indiana	May 18-20	Indianapolis	W. R. Shoemaker, Citizens Bank Bldg., Anderson
Iowa	May 3-6	Des Moines	H. N. Hake, 639 Insurance Exchange Bldg., Des Moines
Kansas	Apr. 26-29	Topeka	F. A. Richmond, Brotherhood Bldg., Kansas City 1
Kentucky	Apr. 5-8	Louisville	A. B. Coxwell, Jr., 2208 Dundee Rd., Louisville 5
Louisiana	Apr. 1-4	Shreveport	J. S. Bernhard, 2515 Line Ave., Shreveport
Maine	June 18-20	Rockland	S. M. Gower, Box 27, Skowhegan
Maryland	May 3-6	Baltimore	C. L. Inman, Jr., Medical Arts Bldg., Baltimore
Massachusetts	May 3-6	Boston	H. E. Tingley, 12 Bay State Rd., Boston 15
Michigan	Apr. 20-22	Grand Rapids	F. Wertheimer, Michigan Dept. of Health, Lansing
Minnesota	Apr. 13-15	Minneapolis	C. V. E. Cassel, 2236 Marshall Ave., St. Paul 4
Mississippi	June 21-24	Biloxi	B. A. Cohen, Box 9981, Jackson 27
Missouri	May 10-13	Springfield	E. D. Suggett, Merchants Bank Bldg., Jefferson City
Montana	May 7-9	Kalispell	R. C. Ritter, 28 N. Black St., Bozeman
Nebraska	Apr. 26-29	Lincoln	F. A. Pierson, Federal Securities Bldg., Lincoln
Nevada	May 10-12	Las Vegas	O. M. Seifert, 755 Ryland Ave., Reno
New Hampshire	June 21-24	Whitefield	F. E. Williams, 814 Elm St., Manchester
New Jersey	May 12-15	Atlantic City	J. G. Carr, 407 Cooper St., Camden



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New Mexico	June 7-10	Santa Fe	W. A. Blueher, 24 Medical Arts Sq., N. E., Albuquerque
New York	May 10-13	Syracuse	C. A. Wilkie, 1 Hanson Pl., Brooklyn 17
North Carolina	May 3-6	Pinehurst	L. H. Butler, Jefferson Bldg., Greensboro
North Dakota	May 3-6	Grand Forks	J. H. Pfister, 419½ Dakota Ave., Wahpeton
Ohio	Nov. 15-18	Cleveland	E. G. Jones, 185 E. State St., Columbus
Oklahoma	Apr. 26-29	Tulsa	L. D. Wright, Osler Bldg., Oklahoma City
Oregon	Mar. 2-4	Portland	T. D. Holder, Selling Bldg., Portland
Panama C. Z.			G. E. Lilly, Box 29, Ft. Clayton
Pennsylvania	May 13-16	Harrisburg	M. D. Zimmerman, 217 State St., Harrisburg
Puerto Rico	Jan.	San Juan	J. E. Munoz, Box 9023, Santurce
Rhode Island	Jan. 20, 21	Providence	H. A. McGuirl, Union Trust Bldg., Providence
South Carolina	May 24-26	Charleston	J. E. Wallace, 1506 Gregg St., Columbia
South Dakota	May 31-June 2	Rapid City	R. E. Decker, Box 308, Parker
Tennessee	May 11-14	Nashville	K. P. Ezell, 116 N. Academy, Murfreesboro
Texas	May 3-6	San Antonio	C. A. McMurray, 3707 Gaston Ave., Dallas 10
Utah	May 21-23	Salt Lake City	R. C. Dalgleish, State Capitol Bldg., Salt Lake City
Vermont	June 26-28	Manchester	E. C. Woods, 36 Washington St., Rutland
Virginia	Apr. 8-11	Roanoke	W. T. McAfee, Colonial National Bank Bldg., Roanoke
Washington	Apr. 6-8	Seattle	G. D. Dore, Jr., 211 Medical Dental Bldg., Seattle 1
West Virginia	July 19-22	White Sulphur Springs	G. N. Casto, Jr., 710½ Lee St., Charleston
Wisconsin	Apr. 27-29	Milwaukee	C. J. Baumann, Jr., 606 W. Wisconsin Ave., Milwaukee
Wyoming	June 18-20	Moran	T. J. Drew, State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	*Date*	*Place*	*Secretary and Address*
Alabama	June 21-27‡		W. L. Smith, 524 Chestnut St., Gadsden
Alaska	July 7-10*†	Anchorage	R. H. Williams, Box 2122, Juneau
Arizona	June 15‡		W. G. Biddulph, 1611 N. Second Ave., Glendale
Arkansas	June 15-19	Little Rock	G. Cone, 113 S. Pecan St., Osceola
California	Feb. 2 June 22 July 27 August 31	Los Angeles Los Angeles San Francisco San Francisco	D. K. Grant, 507 Polk St., San Francisco
Colorado	June 21-27	Denver	R. F. Gilmore, Republic Bldg., Denver 2
Connecticut			A. P. Delfini, 265 Church St., New Haven
Delaware			J. F. Maguire, 1200 N. Van Buren St., Wilmington
Dist. of Columbia			W. T. Birthright, 1835 Eye St., N.W., Washington
Florida	July 5-16*‡ July 6, 7†‡		R. P. Taylor, Jr., P. O. Box 2913, Jacksonville 3
Georgia	June 8-10*†	Atlanta	W. G. Brown, Blackshear
Hawaii	Feb. 19-23	Honolulu	J. Y. Ing, James Campbell Bldg., Honolulu
Idaho			W. M. Smith, 305 Fort St., Boise
Illinois			W. A. McKee, Wood Bldg., Benton
Indiana	Dec. 8-11*†	Indianapolis	C. A. Frech, Gray National Bank Bldg., Gary
Iowa	June 1-5*†	Iowa City	P. A. Hahn, Farmers & Merchants Bank Bldg., Burlington
Kansas			G. L. Teall, Box 71, Hiawatha
Kentucky			J. J. Kelly, 102 W. Madison St., Franklin
Louisiana			A. R. deNux, Marksville
Maine			A. S. Appleby, Box 260, Skowhegan
Maryland			W. D. Burton, 829 Park Ave., Baltimore 1
Massachusetts			C. R. Williams, 70 Washington St., Salem
Michigan	Jan. 18-24*† June 7-13*†	Ann Arbor	J. L. Champagne, 3714 W. McNichols Rd., Detroit 21
Minnesota			E. A. Nelson, 2236 Marshall Ave., St. Paul 4 W

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Mississippi	Jan. 5-7*†‡		A. H. Richter, Jr., Aven Bldg., Greenwood
Missouri			R. R. Rhoades, Central Trust Bldg., Jefferson City
Montana			R. O. Betzner, 303 Power Block, Helena
Nebraska			H. E. Weber, Stuart Bldg., Lincoln
Nevada	Dec. 7	Reno	R. Whitehead, 40 W. First St., Reno
New Hampshire			S. G. Markos, 8 Renaud Ave., Dover
New Jersey	Dec. 1, 2* Dec. 3* Dec. 2†	Philadelphia Trenton Philadelphia	C. J. Schweikhardt, 150 E. State St., Trenton
New Mexico			G. D. Hastain, Box 1007, Clovis
New York	June 23-26* June 23, 24†	New York Albany Syracuse Buffalo Rochester	D. W. Beier, 23 S. Pearl St., Albany 7
North Carolina	June 22*†	Chapel Hill	J. H. Guion, Doctors Bldg., Charlotte 7
North Dakota	July 13-17	Fargo	G. F. Wirtz, Clinic Bldg., Mandan
Ohio			D. E. Bowers, 322 E. State St., Columbus 15
Oklahoma	Dec. 28-30* Dec. 28, 30†	Oklahoma City	W. H. Stephens, Plaza Court Bldg., Oklahoma City
Oregon	Dec. 8-11*†	Portland	F. L. Utter, Pioneer Trust Bldg., Salem
Pennsylvania			P. Swanson, 8111 Jenkins Arcade, Pittsburgh
Puerto Rico			J. Mercado C., Comercio St. #452, San Juan
Rhode Island			F. M. Hackett, 267 Academy Ave., Providence
South Carolina			W. J. Brockington, 1508 Washington St., Columbia 1
South Dakota			H. T. Aker, Canton
Tennessee	Dec. 15‡		C. R. Aita, Bennie-Dillon Bldg., Nashville
Texas			R. T. Weber, Capital National Bank Bldg., Austin 16
Utah	June 22-27‡		R. W. Fishburn, 4 Professional Center, Brigham City
Vermont	June 22-24‡		P. M. Fitch, Newport
Virginia	June 8-13* June 10, 11†	Richmond	J. M. Hughes, Medical Arts Bldg., Richmond
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West Virginia	June 22-24‡		C. C. Cottrill, Box 111, Glen Rogers
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MEETINGS OF OTHER ORGANIZATIONS

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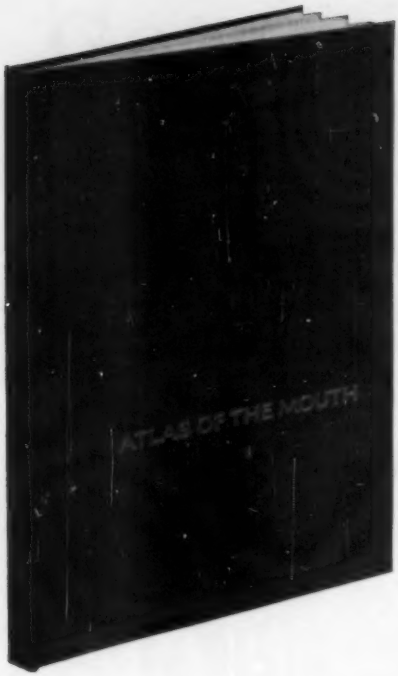
Academy of Dentistry for the Handicapped	Feb. 8	Chicago	R. Kaplan, 3038 Federal St., Camden, N.J.
Academy of Denture Prosthetics	Apr. 12-17	Louisville, Ky.	W. L. Warburton, Medical Arts Bldg., Salt Lake City 11
Academy of General Dentistry	Feb. 10	Chicago	Albert L. Knab, 8500 S. Stony Island Ave., Chicago
All India Dental Conference (Twenty-fourth)	Feb. 19	Bangalore	R. S. Padmanabhan, 29 Vanivilas Road, Basavangudi, Bangalore 4, India
American Academy of Crown and Bridge Prosthodontics	Feb. 7, 8	Chicago	W. E. Corry, 2165 Adelbert Rd., Cleveland 6
American Academy of Dental Medicine	Dec. 7 May 14-17	New York Atlantic City	W. I. Levine, 809 Cathedral St., Baltimore, Md.
American Academy of Dental Practice Administration	Feb. 5, 6	Chicago	R. H. Campbell, 18595 Grand River Ave., Detroit 23



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American Academy of Occlusodontia	Feb. 7	Chicago	S. S. Goldberg, 4753 N. Broadway, Chicago 40
American Academy of Oral Pathology	Apr. 17-19	Minneapolis	R. J. Gorlin, School of Dentistry, University of Minnesota, Minneapolis 14
American Academy of Restorative Dentistry	Feb. 7, 8	Chicago	M. H. Mortonson, Jr., 735 N. Water St., Milwaukee 2
American Association for the Advancement of Science, Section on Dentistry	Dec. 29	Washington, D.C.	R. W. Bunting, University of Michigan, School of Dentistry, Ann Arbor, Mich.
American Association for Cleft Palate Rehabilitation	Apr. 30-May 2	Philadelphia	D. C. Spriestersbach, Dept. of Otolaryngology, University Hospitals, Iowa City, Iowa
American Association of Endodontists	Feb. 6-8	Chicago	V. B. Milas, 2559 W. 63rd St., Chicago 29
American Association of Industrial Dentists	Apr. 27-29	Chicago	E. R. Aston, Pennsylvania Dept. of Health, P.O. Box 90, Harrisburg, Pa.
American Association of Orthodontists	May 4-7	Detroit	E. E. Shepard, 8230 Forsyth Blvd., St. Louis
American Board of Oral Pathology	Dec. 6, 7		D. A. Kerr, University of Michigan, School of Dentistry, Ann Arbor, Mich.
American Board of Oral Surgery	Dec. 1 Apr. 2-6	Chicago Chicago	L. M. FitzGerald, Roshek Bldg., Dubuque, Iowa
American Board of Orthodontics	Apr. 27-May 2	Detroit	W. L. Wylie, University of California, The Medical Center, San Francisco
American Denture Society	Feb. 6, 7	Chicago	V. L. Steffel, College of Dentistry, Ohio State University, Columbus, Ohio
American Equilibration Society	Feb. 5	Chicago	M. M. Devan, Spruce Medical Bldg., Philadelphia
Australian Dental Congress (Fifteenth)	Feb. 23-27	Adelaide, So. Australia	M. J. Barrett, 51 Grenfell St., Adelaide, So. Australia
British Dental Association	May 25-29	Torquay, England	Secretary, British Dental Association, 13 Hill St., Berkeley Square, London W. 1
Canadian Dental Association	June 21-24	Halifax	D. W. Gullett, 234 St. George St., Toronto 5, Canada
Central Dental Association	Jan. 18-21	Whitefish, Mont.	R. E. Baker, Lowry Bldg., St. Paul 2
Chicago Dental Society	Feb. 8-11	Chicago	K. S. Richardson, 30 N. Michigan Ave., Chicago
Council on Dental Education, Dental Aptitude Tests	Jan. 9, 10 Apr. 17, 18		S. Peterson, 222 E. Superior St., Chicago 11
Cuban National Dental Congress (Fifth)	Mar. 29-31	Havana	C. Funcia C., No. 353, Vedado, Havana, Cuba
Dallas Mid-Winter Dental Clinic (Thirty-second)	Jan. 25-28	Dallas, Texas	M. Thornton, 2921 Fairmount, Dallas, Texas
Denver Dental Association	Jan. 11-14	Denver	W. D. McCarthy, Republic Bldg., Denver 2
Florida East Coast Dental Society	Jan. 9, 10	Miami, Fla.	A. Linsner, 2 S.E. 13th St., Miami 32, Fla.
Greater New York Dental Meeting (Thirty-fourth)	Dec. 8-12	New York	M. Purdy, Statler Hotel, New York 1
Greater Philadelphia	Mar. 3-6	Philadelphia	M. Kohn, Sheraton Hotel, 17th St. and Pennsylvania Blvd., Philadelphia 3
International Association for Dental Research	Mar. 19-22	San Francisco	D. Y. Burrill, Northwestern University, 311 E. Chicago Ave., Chicago 11
Japan Dental Association	Mar.	Tokyo, Japan	T. Kashima, 6-4 Kudan Chiyoda-ku, Tokyo
Midwest Society of Periodontology	Feb. 7, 8	Chicago	G. Roth, University of Kansas City, School of Dentistry, 1108 E. Tenth St., Kansas City 6, Mo.
Montana, Ninth District Dental Society	Jan. 15-17	Billings	C. H. Betzer, 1231 N. 29th St., Billings, Mont.
National Board of Dental Examiners	Dec. 1, 2		G. J. Casey, 222 E. Superior St., Chicago 11
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Rumanian Stomatological Congress	Dec.		N. Herman, Section de Stomatologie de la Societe des Sciences Medicales de la Republique Populaire Roumaine, Str. Progresuliu 8, Bucharest, Rumania
Southeastern Academy of Prosthodontics	Mar. 13-15	Atlanta, Ga.	H. C. Parker, Liberty Life Building, Charlotte 2, N.C.
Southeastern Society of Oral Surgeons	May 7-9	Gatlinburg, Tenn.	P. B. Whittington, Jr., Medical Arts Bldg., Greensboro, N.C.
Southern Academy of Oral Surgery	Mar. 14, 15	Atlanta, Ga.	T. E. Braly, Volunteer Bldg., Chattanooga, Tenn.
Southern Academy of Periodontology	June 11-13	Gatlinburg, Tenn.	J. R. Owings, 7 Medical Ct., Greenville, S.C.
Thomas P. Hinman Dental Clinic	Mar. 15-18	Atlanta, Ga.	H. W. Wallace, 1193 The By Way, N.E., Atlanta, Ga.
U.S.C. Dental Study Group of Mexico, Twelfth Annual Seminar	May 17-21	Acapulco, Mex.	C. J. Cornish, Paseo de la Reforma 510-601, Mexico 6, D.F.
Western Society of Periodontology	Mar. 15-17	Las Vegas, Nev.	E. F. Johnson, 250 E. Seventh St., Upland, Calif.

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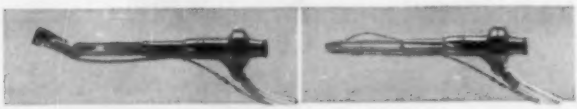

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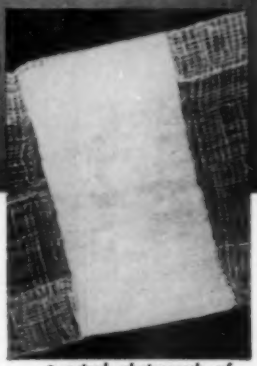

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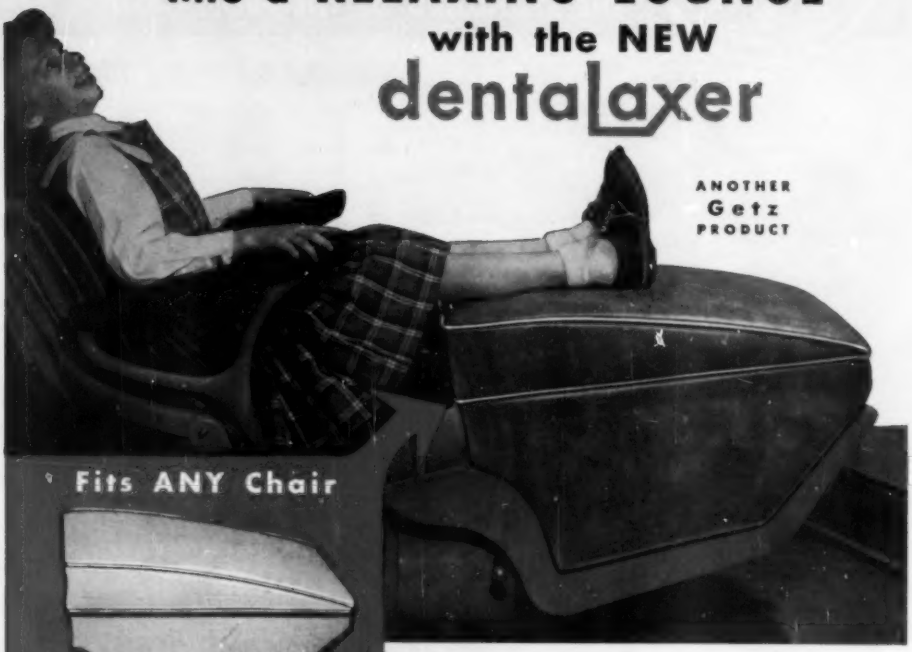

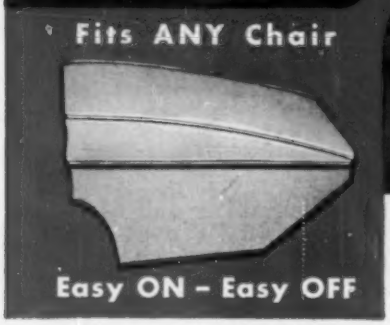

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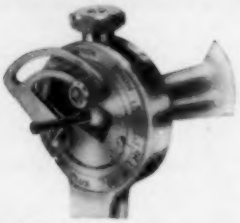

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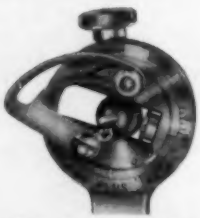

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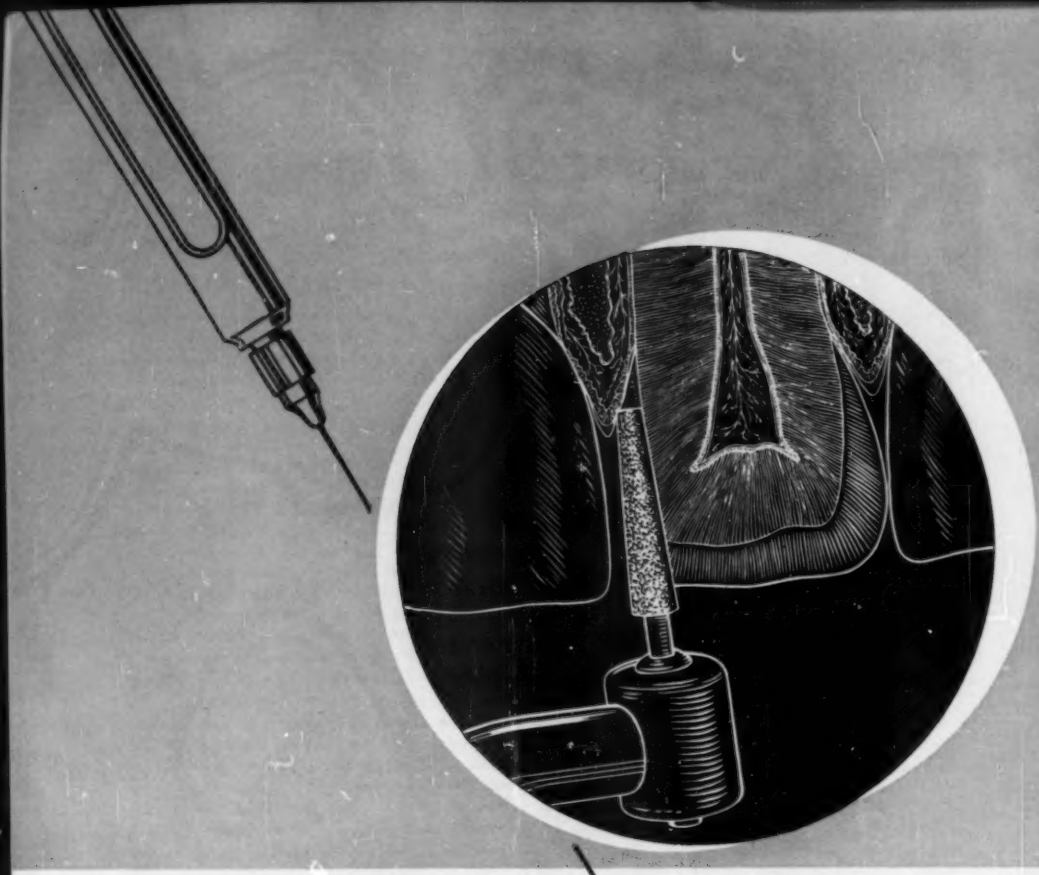

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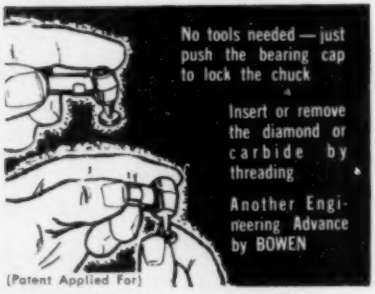
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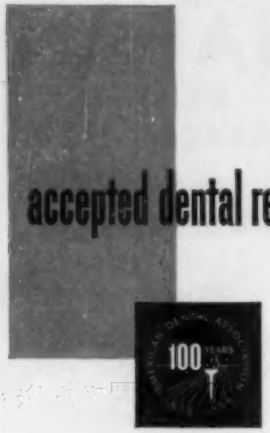

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University of Southern California
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Los Angeles 7, California

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Georgetown University
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Washington 7, D. C.

College of Dentistry
Howard University
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Washington 1, D. C.

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School of Dentistry
Atlanta-Southern Dental College
Emory University
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Atlanta 3, Georgia

ILLINOIS
Chicago College of Dental Surgery
Loyola University
1757 West Harrison Street
Chicago 12, Illinois

The Dental School
Northwestern University
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Chicago 12, Illinois

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Washington Ave. and Union St., S.E.
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1108 East Tenth Street
Kansas City 6, Missouri

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St. Louis University
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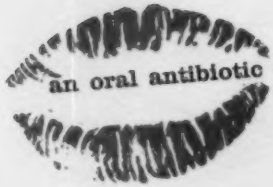

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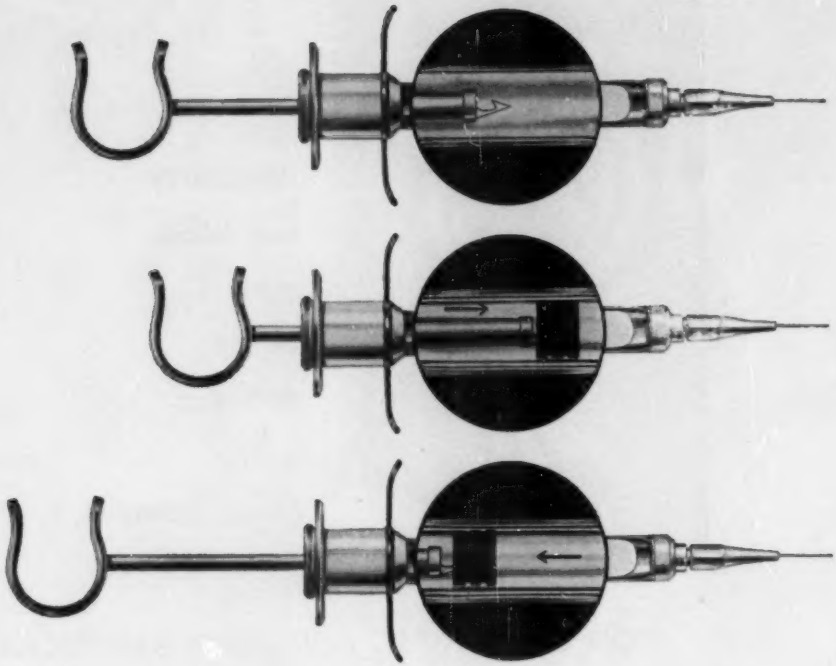

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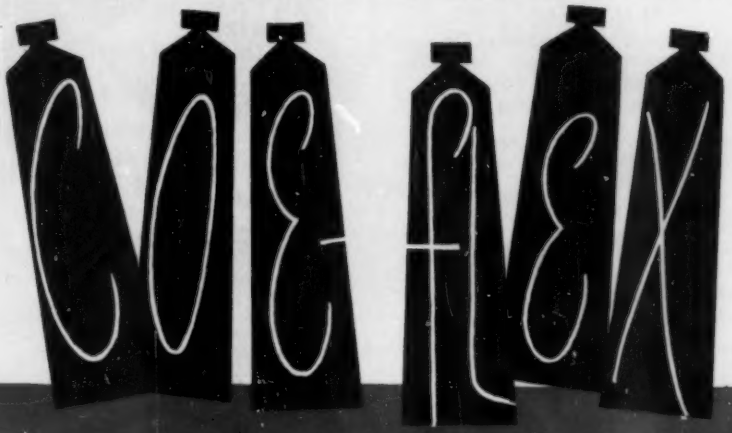

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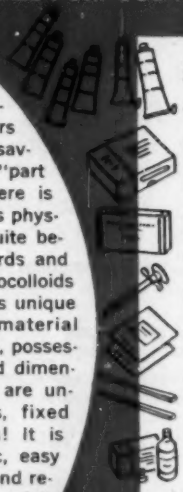

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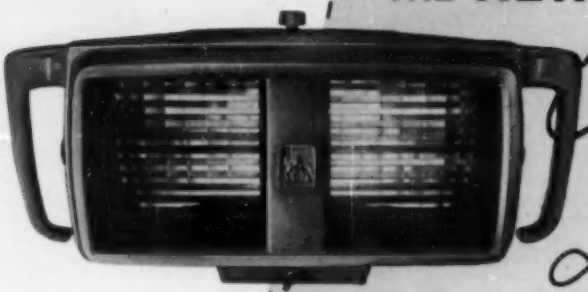

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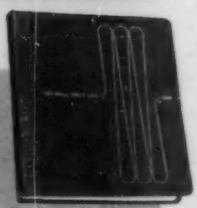

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1. King, C. G.: J. Am. Diet. A. 30:13, 1954.
2. Kelsten, L. B.: J. Dent. Med. 10:67, 1955.
3. Amer. Dent. Assoc.: Diet and Dental Health, Chicago, 1955, pp. 7-8.

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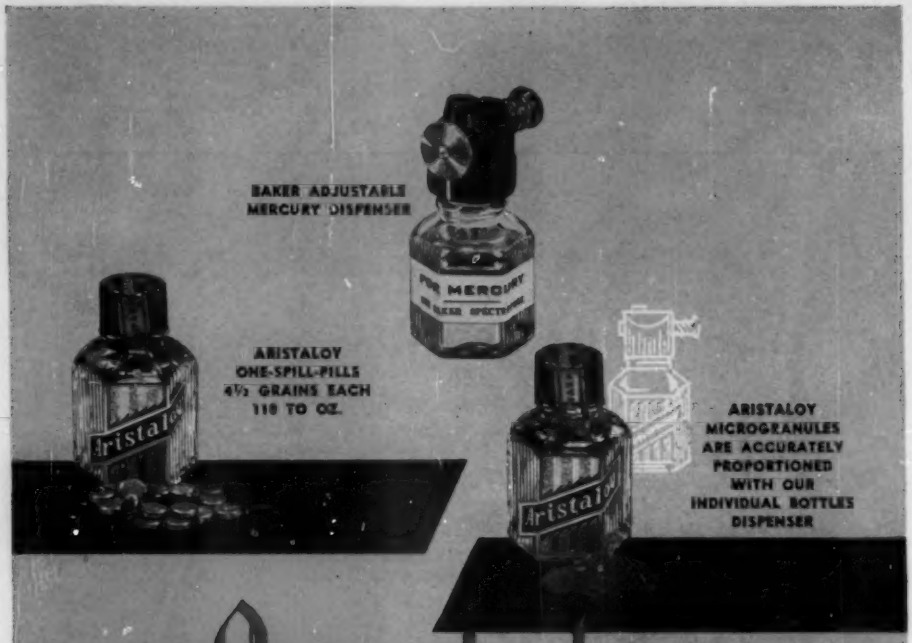

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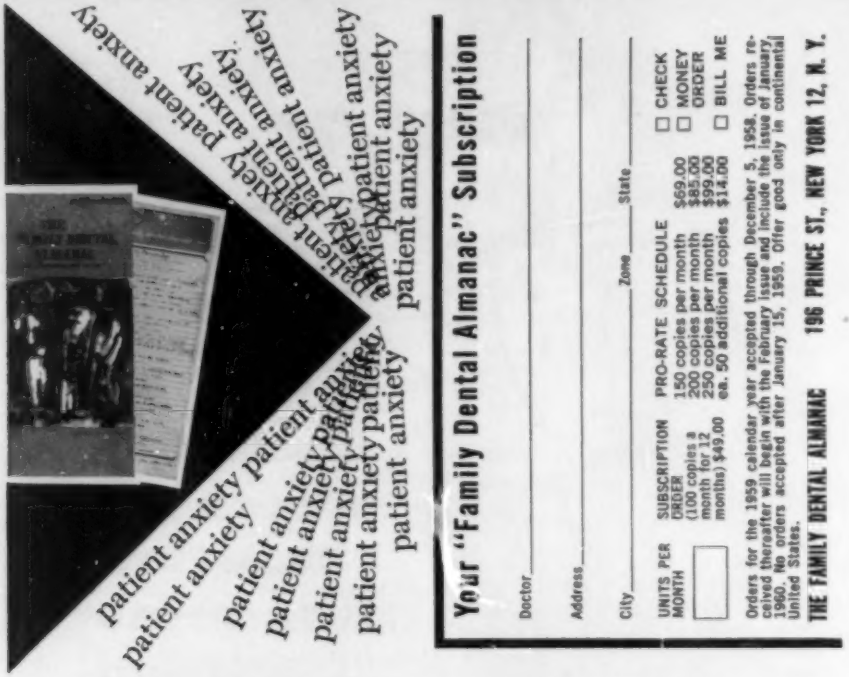
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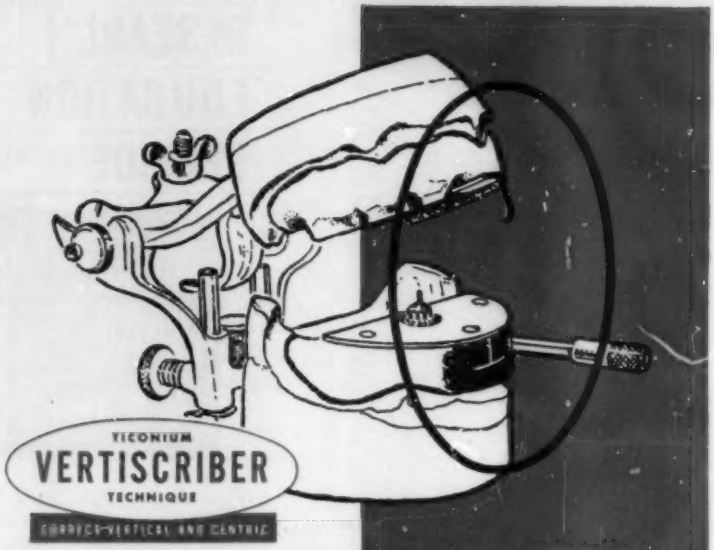

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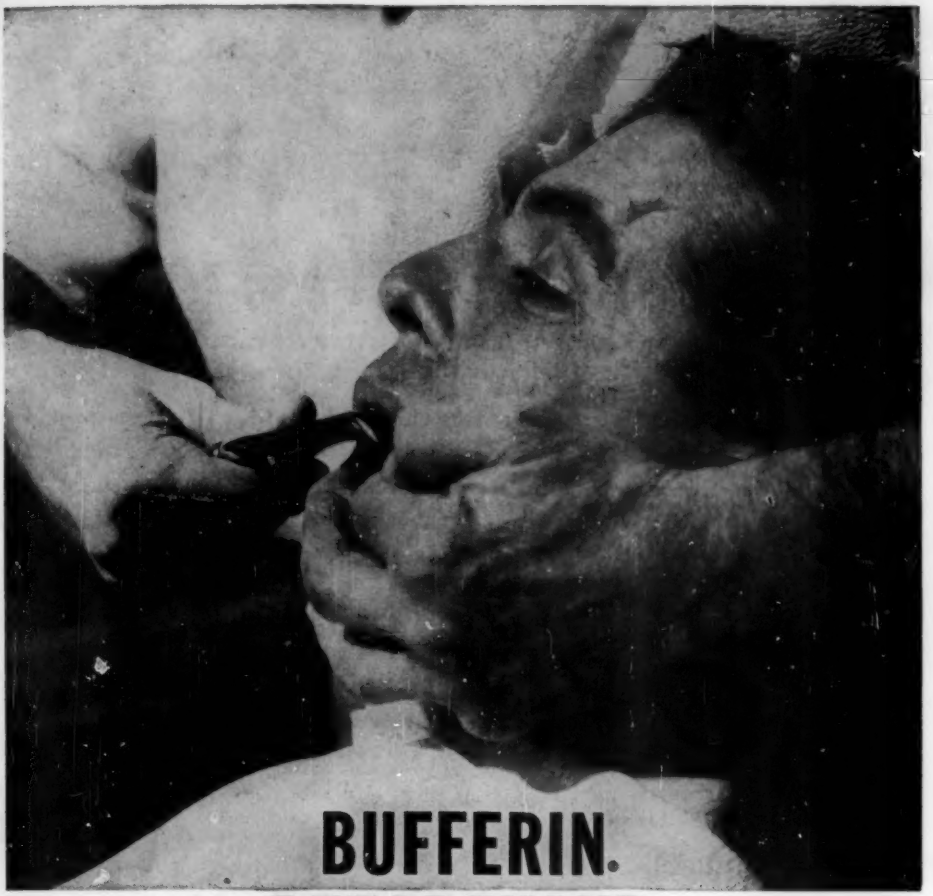

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